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ANNUAL REPORT

OF THE

STREET DEPARTMENT

OF THE

CITY OF BOSTON.

1893. * 635859



BOSTON:

ROCKWELL AND CHURCHILL, CITY PRINTERS.

1894.

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Boston. Sept 1

June 14 1893

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CONTENTS.

REPORT OF SUPERINTENDENT OF STREETS.

CENTRAL OFFICE.		PAGE
Central Office Division	2	
Complaints	25	
Expenses Central Office	2	
Employment of Labor	22	
Financial Statement (General),	3	
Grade and Number of Em- ployees	23-24	
Income	8	
Laying Out and Construction (new law)	7	
List of Contracts ...	9-21	
Organization	1	
Recapitulation of Expenditures,	8	
Special Appropriations.	4-7	
BRIDGE DIVISION	26	
Abolition of Grade Crossings.	34-38	
Boston and Cambridge Bridges,	47	
Broadway Bridge	46	
Classification of Expenditures,	50	
Canal or Craigie's Bridge	48	
Chelsea Bridge	27	
Court Decree	29	
Draw Openings	51	
Dover-Street Bridge.	40	
Harvard Bridge	48	
In General	49	
Prison-Point Bridge	49	
Statement of Traffic over Bridges	51	
West Boston Bridge	49	
West Fourth-Street Crossing,	38	
West Fourth-Street, Finding of Commissioners	40-45	
West Chester-Park Bridge ...	45	
PAVING DIVISION	52	
Areas of Pavements	53	
Brick Sidewalks	69	
Comments on Assessments...	69	
Chap. 401 of the Acts of 1892,	70	
Chap. 323 of the Acts of 1891,	71	
Chap. 437 of the Acts of 1893,	73	
Distribution of Pavements ...	54	
Edgestones and Sidewalks	68	
Length of Accepted Streets and Character of Pavements,	52-53	
Pavements laid in 1891	55-58	
Pavements laid in 1893 (Com- ments)	59	
Philadelphia Ordinance	74	
Report of City Engineer on Special Work	60-68	
Street Openings	75	
Streets Laid Out	52	
STREET-WATERING	77	
Contracts for Street-sprinkling,	80	
Comments on Street-watering,	78	
Distribution of Carts	82	
Income	84	
Money Expended, 1893	83	
Money Expended for Last Sixteen Years	84	
Style of Water Carts ...	78	

	PAGE		PAGE
Summary of Day Work	79	Main Drainage Works.....	110
Summary of Contract Work ..	80	Operation of Law of 1889 ...	133
Summary of Work done.....	81	Roxbury District	108
Water-posts	84	Sewer Assessments (Discus-	
Work done at Expense of		sion)	128
Abutters	80	Sewer Assessments, 1878	132
SANITARY DIVISION	86	Sewer Assessments, under Acts	
Amount of House Offal Re-		of 1889-90.....	133-138
moved (10 years)	86	Sewer Assessments under Law	
Amount Ashes Removed (12		of 1892 ..	139
years)	98	South Boston District.....	106
Comparative Statement, Six-		Stony Brook	109
teen Weeks in Winter and		West Roxbury District	108
Summer.....	99	STREET-CLEANING DIVISION,	145
Comments on Tow-boat and		Average No. Men Employed..	146
Dumping-wharf.....	101-102	Ordinances and their Enforce-	
Collection and Disposal of		ment.....	149
Offal	87	Plant	147
Capacity of Offal Wagons....	97	Push-cart Patrol	147
Cremation of Offal.....	89	Public Slovenliness ..	149
Disposition of Material	99	Public Waste Barrels.....	149
Experiments on Cremation of		Street Sweepings Removed (12	
Offal.....	91	years)	148
Force Employed	97	Sweeping Districts	145
General Discussion	96		
New England Construction			
Company	88	SMOKE NUISANCE.....	151
Removal of Ashes	98	Chap. 353, Acts of 1893	153
Store Dirt	100	Circular	155
Tow-boat.....	101	Coking Arches	161
The Brown Crematory.....	89	Down-draft Furnaces ...	157
SEWER DIVISION.....	103	Furnaces with Hollow Walls.	161
Brighton District.....	109	General Remarks ..	164
Charlestown District	105	Instructions for firing	156
City Proper and Back Bay		Ordinances	165
District	106	Remedies without using device,	163
Dorchester District	107	Steam Jets	158
Diagrams	113		
Dynamite	112	Conclusion	168
East Boston District.....	104	Street Department — Organi-	
Intercepting Connections....	111	zation	169
Laws and Ordinances concern-			
ing Sewer Assessment ...	114-127		

APPENDIX A.

REPORT OF DEPUTY SUPERINTENDENT OF BRIDGE
DIVISION. (Page 171.)

	PAGE		PAGE
Appendix A1 (Draw-tenders' Report)	204	Bridges of which Boston Pays a Part of the Cost of Maintenance	200
Appendix A2 (Width of Openings)	206	Bridges Supported by Railroad Corporations	201-202
Appendix A3 (Width of Bridges)	208	Cable-houses	173
Appendix A4 (List of Culverts and Small Bridges) ..	209-213	Financial Statement — Regular Appropriations	173
Appendix A4, List of Culverts and Small Bridges (Supplement)	214-216	Inland Bridges	187-193
Appendix A6 (Statement of Traffic)	217	List of Boston Bridges	199
Appendix A6 (Draw-tenders' Report)	218	Public Landing-places	172
Appropriations and Expenditures	173-174	Recapitulation — Specials	198
Bridges wholly Supported by Boston	199	Recapitulation Expenses on Inland Bridges	193
Bridges of which Boston Supports the Part within its Limits	200	Regular Maintenance Expenses at the North and South Yards	194-5
		Recapitulation Expenses on Tide-water Bridges	186
		Special Work	172
		Special Appropriations	196-198
		Superintendent's Statement ..	171
		Total Regular Expenditures ..	174
		Tide-water Bridges	174-185

APPENDIX B.

REPORT OF DEPUTY SUPERINTENDENT OF PAVING
DIVISION. (Page 221.)

	PAGE		PAGE
Driveways, Block-stone, As-		Street-watering Expenditures,	233
phalt, and Gravel	265	Schedule of Property	265
Expenditures (Details)	229	Street Numbers Assigned . . .	222
Execution of Courts, etc.	229	Streets Laid Out or Extended,	224
Financial Statement.	226	Streets Widened or Relocated,	225
Income	227	Streets Discontinued	225
Laying Out and Construction			
of Highways	259-261	Schedule of Expenditures :	
New Edgestones	261	Schedule A.	229
New Brick Sidewalks	263	Schedule B.	229
Permits Issued	222	Schedule C.	230
Property	265	Schedule D.	231-243
Removal of Snow (Table) . . .	233	Table of Expenditures (38	
Street Improvements (Alder-		years)	221
manic Districts)	243-255	Table of Expenses, Regular	
Summary of Expenditures		Appropriation	228
(Specials)	256-258		

APPENDIX C.

REPORT OF DEPUTY SUPERINTENDENT OF
SANITARY DIVISION. (Page 267.)

	PAGE		PAGE
Amount Expended for Collec-		House Dirt and Ashes	280
tion and Removal of House		Hay and Grain	277
Offal	269	Horse-shoeing and Blacksmith-	
Contracts	275	ing (cost)	274
Contract for Refuse Cans . . .	276	Items of Expenditure	267
Cost of Carts	274	Material Collected and Cost of	
Cost of Horse-shoeing	274	Teams	272
Comparative Table, Collection		Material Collected by Districts,	270
Garbage	271	Number of Carts	273
Disposition of Material Col-		Organization	281
lected	271	Recapitulation (Hay and Grain),	279
Dumping-boats, Expenses of . .	273	Revenue	268
Financial Statement	267	Total Cost, Removal, etc. . . .	269
Horse Account	281	Table of Loads (12 years) . . .	274
House Offal	280		

APPENDIX D.

REPORT OF DEPUTY SUPERINTENDENT OF SEWER
DIVISION. (Page 283.)

	PAGE		PAGE
Catch-basins	315	Work done for Paving Di-	
Financial Statement.....	284	vision	304
Fall of Rain and Snow.....	318		
Improved Sewerage (Expendi-		EAST BOSTON.	
tures).....	285	Sewers Built by Contract or	
Miscellaneous Expenses	285	Day Labor	291
New Tow-boat.....	285	Work done for Paving Di-	
Pumping-station Record	319	vision	292
Property in Charge of Sewer			
Division.....	320	ROXBURY.	
Recapitulation	315	Sewers Built by Contract or	
Stony Brook Improvement...	285	Day Labor	305
		Sewers Built under Chap. 323,	
BRIGHTON.		Acts 1891	307
Sewers Built by Contract or		By Private Parties	308
Day Labor	293	Surface Drains	309
By Private Parties	295	Work done for Paving Di-	
Surface Drains	295	vision	310
Work done for Paving Di-			
vision	296	WEST ROXBURY.	
		Sewers Built by Contract or	
CITY PROPER.		Day Labor	311
Sewers Built by Contract or		By Private Parties	313
Day Labor	287	Culverts	314
Surface Drains	287	Surface Drains	314
Work done for Paving Di-		Work done for Paving Division,	315
vision	288		
		SOUTH BOSTON.	
CHARLESTOWN.		Sewers Built by Contract or	
Sewers Built by Contract or		Day Labor	297
Day Labor	289	By Private Parties	297
Work done for Paving Di-		Work done for Paving Division,	298
vision	290		
		Summary of Sewer Construc-	
DORCHESTER.		tion	316
Sewers Built by Contract or		Sludge Record.....	320
Day Labor	299	Specials, etc.	322-329
By Private Parties	302	Summary of Construction (6	
Surface Drains	303	years)	321
Culverts.....	303	Schedule of Sewers to Date..	317

APPENDIX E.

REPORT OF DEPUTY SUPERINTENDENT OF STREET-
CLEANING DIVISION. (Page 331.)

	PAGE		PAGE
Average Force Employed. . .	338	Financial Statement	331
Complaints	338	General Recapitulation of Ex-	
Cost per Mile, exclusive of		penses	336
Supervision	336	Income	338
Cost per Mile, inclusive of		Miscellaneous	335
Supervision	337	Objects of Expenditure	331
Cleaning Streets, Cost by Dis-		Patrol System	333
tricts	332	Public Waste Barrels	338
Cleaning Gutters, by Districts,	332	Recapitulation of Expenses .	334
Cleaning Crossings	332	Stable and Yard Expenses . . .	335
Cost of Maintaining Dumps . .	332	Stock Account	335
Cost of Removal of Snow . . .	333	Total Number of Loads Street-	
Cost of Scraping Mac. Streets,	333	dirt Removed	337
Cost of Collecting Leaves . . .	333		

APPENDIX F.

FORMER SUPERINTENDENTS AND DOCUMENT NUM-
BERS OF ANNUAL REPORTS. (Page 339.)

LIST OF ILLUSTRATIONS.

	PAGE
Beacon street — Laying Trinidad Asphalt Paving on Cement Concrete	
Base	54
Chart of Dumping Stations	88
Discharge of Outfall Sewer at Moon Island	110
Dumping-Scow (Loading)	98
Dover-street Bridge over Fort-point Channel	40
Gate-house at Moon Island	112
Old Paving — Tremont street	} 58
New Paving — Washington street	
Sewer Diagram, Drainage Area Curves	116
Sewer Diagram, Kutter's Formula ..	114
The Street Department Tow-boat "Cormorant",	102

HON. NATHAN MATTHEWS, JR.,
Mayor of the City of Boston:

SIR: In compliance with the Revised Ordinances, the third annual report of the operations and expenses of the Street Department for the year 1893 is herewith respectfully submitted.

ORGANIZATION.

The work of the department during the past year has been carried on under the same organization that was effected when the consolidated department was created in 1891, the several divisions of the department being as follows:

The Central Office.
Bridge Division.
Paving Division.
Sewer Division.
Sanitary Division.
Street-Cleaning Division.
Boston and Cambridge Bridges.

Each of the above divisions, with the exception of the Central Office Division and the Boston and Cambridge Bridges, is in charge of a deputy superintendent.

The Boston and Cambridge Bridges are managed by two commissioners, the Superintendent of Streets being the commissioner for the city of Boston, the other commissioner being appointed by the Mayor of the city of Cambridge.

The work of street-watering, which devolves on the Street Department, is carried on under the supervision of the Paving Division, with a foreman of street-watering in charge.

CENTRAL OFFICE DIVISION.

The work of the Central Office Division consists of general supervision over the work of the several divisions of the department; attending to all correspondence, purchasing supplies, investigating complaints, drawing and executing contracts, keeping of all records, financial, civil service, and legal, preparing estimates for public improvements, and other miscellaneous work.

EXPENSES OF THE CENTRAL OFFICE.

For the current expenses of the Central Office the City Council appropriated the sum of twenty thousand dollars (\$20,000), to which was transferred from the Paving Division for the care of horses the sum of eight hundred five dollars and ninety-six cents (\$805.96), making a total of twenty thousand eight hundred five dollars and ninety-six cents (\$20,805.96), which was expended as follows:

Salaries	\$17,057 78
Travelling expenses, carriages, etc.	1,032 10
Board, shoeing, clothing, etc., of horses	966 60
Stationery, printing, postage, etc.	714 80
Telephone and telegraph	396 28
Miscellaneous expenses (office)	161 06
Copying and compiling	159 76
Newspapers, periodicals, etc.	90 08
Messengers	86 95
Atlases, maps, etc.	72 50
Typewriter supplies	55 65
Rubber stamps, pads, etc.	12 40
Total	<u>\$20,805 96</u>

The following condensed statement shows the various appropriations and amounts expended for the maintenance of the department for the year ending January 31, 1894; also, in separate tables, the special appropriations and amounts expended for specific objects designated by the City Council:

FINANCIAL STATEMENT OF THE STREET DEPARTMENT APPROPRIATION.

From February 1, 1893, to January 31, 1894, inclusive.

MAINTENANCE.

APPROPRIATION.	Appropriation and transfers during 1893.	Revenue.	Total Credits.	Expenditures for the twelve months ending January 31, 1894.	Balances Janua y 31, 1894.
Street Department:					
Bridge Division	\$135,000 00	. . . . .	1 \$135,000 00	\$133,159 24	\$1,840 76
Boston and Cambridge Bridges	13,000 00	. . . . .	2 13,000 00	11,493 16	1,506 84
Central Office	20,805 96	. . . . .	3 20,805 96	20,805 96	
Paving Division	779,194 04	\$4,093 74	4 783,287 78	743,681 52	37,006 26
Sanitary Division	485,000 00	. . . . .	5 485,000 00	481,300 63	3,699 37
Sewer Division	385,122 20	. . . . .	6 385,122 20	373,517 38	11,604 82
Street Cleaning Division	308,552 80	154 50	7 308,707 30	308,707 30	
Street-Watering	100,000 00	594 52	8 100,594 52	99,430 19	1,164 36
Totals	\$2,226,675 00	\$4,842 76	\$2,231,517 76	\$2,174,095 35	0 \$57,422 41
1 Appropriation for 1893-4	\$135,000 00	5 Appropriation for 1893-4	\$470,000 00	8 Appropriation for 1893-4	\$100,000 00
2 Appropriation for 1893-4	\$13,000 00	Transferred from Paving Division . . .	15,000 00	Transferred from Fire Department . . .	401 95
3 Appropriation for 1893-4	\$20,000 00	6 Appropriation for 1893-4	\$485,000 00	" " Board of Police . . .	192 57
Transferred from Paving Division . . .	805 96	Transferred from Paving Division . . .	\$550,000 00		\$100,594 52
4 Appropriation for 1893-4	\$20,805 96	Transferred from Paving Division . . .	40,000 00		
Transferred from "special appropriations" for blocks and for repaving for corporations	\$50,000 00	Transferred to Street-Cleaning Division . . .	\$390,000 00	9 Transferred to City Treasury	\$57,422 41
Transferred to Sewer Division	\$40,000 00	Transferred to Mt. Vernon Street "Grade Damages". . .	1,325 00		
Transferred to Sanitary Division	15,000 00		4,877 80		
Transferred to Street-Cleaning Division	15,000 00	7 Appropriation for 1893-4	\$200,000 00		
Transferred to Central Office,	805 96	Transferred from Paving Division . . .	\$15,000 00		
		Transferred from Sewer Division	3,552 80		
		Removing Gravel	154 50		
			18,707 30		
			\$308,707 30		

Paving Division Specials.

OBJECT OF APPROPRIATION.	Appropriations, Balances, and Transfers.	Expended from Feb. 1, 1893, to Jan. 31, 1894.	Balance on hand, Jan. 31, 1894.
Baker st., Ward 23	\$2,000 00	\$649 60	\$1,350 40
Beacon st.	108 90	108 90	
Bellflower st.	3,000 00		3,000 00
Berwick park, foot-bridge	6,000 00		6,000 00
Blue Hill ave., paving	25,000 00		25,000 00
Blakeville st.	1,500 00		1,500 00
Erent st.	1,526 28	1,526 28	
Bristol st.	2,869 28	2,869 28	
Broadway, Harrison ave. to Broadway bridge . .	7,782 42	7,782 42	
Burney st., Ward 22	7,500 00		7,500 00
Bushnell st.	2,000 00		2,000 00
Chardon st.	349 45	349 45	
Cherry st.	65 10	65 10	
Commonwealth ave.	321,062 20	266,246 65	54,815 55
Congress and L sts.	30,000 00	15,300 00	14,700 00
Cooper st., between N. Margin and Salem sts. . .	1,500 00	1,500 00	
Cranston st., Ward 23	3,000 00	1,158 20	1,841 80
Dickens st.	785 00	785 00	
Dorchester ave., paving, Wards 15 and 24	2,700 37	2,700 37	
Dorchester st., between Eighth st. and Dorchester ave., paving	386 09	386 09	
Eighth st., L st. to O st., edgestones, etc. . . .	1,249 69	1,249 69	
Englewood ave. and Sutherland road	4,739 95	4,739 95	
Freeport st.	10,849 55	10,849 55	
Grant st., Ward 24	241 52	241 52	
Harbor View st.	562 96	562 96	
Harrison ave., Kneeland st. to Bennett st., asphalting	3,900 00		3,900 00
Harvard st., construction	6,000 00	6,000 00	
Houghton st., macadamizing	6,550 40	6,550 40	
Howell st., construction	2,880 61	2,880 61	
Humboldt-ave. extension, grade damages	225 52	225 52	
Hunneman st., grading and constructing	963 45	963 45	
<i>Carried forward</i>	\$457,298 74	\$335,690 99	\$121,607 75

Paving Division Specials.—*Concluded.*

OBJECT OF APPROPRIATION.	Appropriations, Balances, and Transfers.	Expended from Feb. 1, 1893, to Jan. 31, 1894.	Balance on hand Jan. 31, 1894.
<i>Brought forward</i>	\$457,298 74	\$335,690 99	\$121,607 75
Jackson st., construction	1,500 00	1,500 00	
L st., grading, etc.	2,346 50	2,346 50	
LaGrange st.	3,269 30	3,269 30	
Landing, East Boston	500 00	500 00	
Lehigh st., paving	2,831 78	2,831 78	
Lexington ave.	1,702 90	1,702 90	
Mill st.	2,000 00	. . . . .	2,000 00
Mt. Vernon st., grade damages	1,325 00	. . . . .	1,325 00
Newport st.	2,500 00	. . . . .	2,500 00
Ninth st., Old Harbor st. to N st., macadamizing	5,827 14	5,827 14	
Norfolk st., Milton st. to Corbett st.	2,350 00	2,350 00	
Parmenter st., construction	1,500 00	1,500 00	
Preston st.	5,000 00	. . . . .	5,000 00
River st.	4,000 00	4,000 00	
Sawyer ave.	2,713 44	2,713 44	
Short st., Ward 23	1,806 73	1,806 73	
Smith st., construction	2,008 10	2,008 10	
South Margin st., between Pitts and Prospect sts.,	4,500 00	4,500 00	
Stanton st.	2,000 00	2,000 00	
Thetford st.	3,000 00	. . . . .	3,000 00
Utica st., Harvard st. to Kneeland st.	7,000 00	. . . . .	7,000 00
Vale st., Ward 15	1,000 00	1,000 00	
Van Rensselaer place, paving	450 00	. . . . .	450 00
West Newton st., between Washington st. and Shawmut ave., asphalt blocks	161 26	161 26	
West Third st., Ward 13	1,900 00	1,900 00	
Whiting st., Ward 21	5,500 00	1,600 00	3,900 00
Worthington st., edgestones, etc.	1,000 00	1,000 00	
¹ Allston bridge	2,504 56	2,504 56	
Park st., Charlestown	1,168 02	1,168 02	
Totals	\$530,603 47	\$383,880 72	\$146,722 75

¹ Money furnished by the City Engineer's Department.

Sewer Division Specials.

OBJECT OF APPROPRIATION.	Appropriations, Balances, and Transfers.	Expended from Feb. 1, 1893, to Jan. 31, 1894.	Balance on hand Jan. 31, 1894.
Sewer, between Roslindale and West Roxbury . .	\$380 00	\$100 00	\$280 00
Sewers, Brighton	2,486 47	. . . . .	2,486 47
Sewer outlets, East Boston	1,762 95	1,762 95	
Sewers, South Boston	3,475 14	1,127 09	2,348 05
Sewers, Ward 23, Washington st., etc.	716 41	125 12	591 29
Sewers, Westville, Freeman, and Charles sts. . .	215 00	215 00	
Stables and sheds, Brighton	5,957 92	5,957 92	
Tug-boat	12,432 50	12,432 50	
Totals	\$27,426 39	\$21,720 58	\$5,705 81

Bridge Division Specials.

OBJECT OF APPROPRIATIONS.	Appropriations, Balances, and Transfers.	Expended from Feb. 1, 1893, to Jan. 31, 1894.	Balance on hand Jan. 31, 1894.
Berkeley-st. bridge	\$433 75	\$433 75	
Boylston-st. bridge	1,432 82	. . . . .	\$1,432 82
Broadway bridge	8,500 00	7,498 86	1,001 14
Congress-st. bridge, guard	534 31	534 31	
¹ Savin Hill-ave. bridge, widening	5,000 00	5,000 00	
Totals	\$15,900 88	\$13,466 92	\$2,433 96

¹ Work done by and paid for by the Paving Division.

Aldermanic District Specials.

OBJECT OF APPROPRIATION.	Appropriations, Balances, and Transfers.	Expended from Feb. 1, 1893, to Jan. 31, 1894.	Balance on hand Jan. 31, 1894.
Street Improvements, Aldermanic District No. 1 .	\$34,000 00	\$34,000 00	
Street Improvements, Aldermanic District No. 2 .	28,000 00	24,314 25	\$3,685 75
Street Improvements, Aldermanic District No. 3 .	11,000 00	9,884 02	1,115 98
Street Improvements, Aldermanic District No. 4 .	14,000 00	9,962 57	4,037 43
Street Improvements, Aldermanic District No. 5 .	44,465 30	43,927 48	537 82
Street Improvements, Aldermanic District No. 6 .	20,897 76	17,444 32	3,453 44
Street Improvements, Aldermanic District No. 7 .	24,281 50	20,935 21	3,346 29
Street Improvements, Aldermanic District No. 8 .	15,000 00	9,830 71	5,169 21
Street Improvements, Aldermanic District No. 9 .	12,610 65	9,096 77	3,513 88
Street Improvements, Aldermanic District No. 10 .	19,000 00	19,000 00	
Street Improvements, Aldermanic District No. 11 .	35,000 00	34,732 96	267 04
Street Improvements, Aldermanic District No. 12 .	34,000 00	32,109 31	1,890 69
Street Improvements, Ward 6	13,000 00		13,000 00
Street Improvements, Ward 7	18,668 54		18,668 54
Street Improvements, Ward 8	13,000 00		13,000 00
Street Improvements, Ward 9	5,000 00		5,000 00
Street Improvements, Ward 10	5,000 00		5,000 00
Street Improvements, Ward 12	6,283 73	6,283 73	
Street Improvements, Ward 14	14,500 00		14,500 00
Street Improvements, Ward 15	11,500 00		11,500 00
Street Improvements, Wards 17 and 18	15,000 00		15,000 00
Totals	\$394,207 48	\$271,521 33	\$122,686 15

LAYING OUT AND CONSTRUCTION OF HIGHWAYS.

Expenditures.

Sewer construction	\$260,724 44
Street construction	29,817 30
Sidewalk construction	21,771 74
Total	\$312,313 48

Streets built under Chap. 323 of the Acts of 1891, as amended by Chap. 418 of the Acts of 1892.

	Paving.	Sewer.	Total.
Batavia street	\$9,063 73	\$5,027 04	\$14,090 77
Bay State road	10,634 20	11,734 00	22,368 20
Deerfield street	3,098 18	3,291 64	6,389 82
Miner street	7,021 19	1,431 39	8,452 58
Totals	\$29,817 30*	\$21,484 07*	\$51,301 37*

* Amount retained on Paving contracts \$2,881 57 yet to be paid.
 * " " " Sewer " " " " " 600 36 " " "

* Total amount retained \$3,481 93

**Recapitulation of Expenditures for the Twelve Months
ending January 31, 1894.**

OBJECT OF APPROPRIATION.	Current Expenses for the twelve months end- ing Jan. 31, 1894.	Special Ap- propriations.	Totals.
Street Department:			
Central Office	\$20,805 96	. . . . .	\$20,805 96
Bridge Division	133,159 24	\$13,466 92	146,626 16
Boston and Cambridge Bridges	11,493 16	. . . . .	11,493 16
Paving Division	745,681 52	383,880 72	1,129,562 24
Sewer Division	373,517 38	21,720 58	395,237 96
Sanitary Division	481,300 63	. . . . .	481,400 63
Street-Cleaning Division	308,707 30	. . . . .	308,707 30
Street-Watering	99,430 16	. . . . .	99,430 16
Street Improvements, Aldermanic Districts . . . . .	. . . . .	271,521 33	271,521 33
Laying Out and Construction of Highways . . . . .	. . . . .	312,313 48	312,313 48
Totals	\$2,174,095 35	\$1,002,903 03	\$3,176,998 38

INCOME.

Statement showing the amount of bills and cash deposited with the City Collector for the year ending January 31, 1894, by the several divisions of the Street Department:

Paving Division	\$46,855 92
Sewer Division	151,929 78
Sanitary Division	32,056 27
Bridge Division	1,687 00
Street-Cleaning Division	6,049 82
Boston and Cambridge Bridges	752 68
Street-Watering	110 00
	<u>\$239,441 47</u>

Statement showing the amount paid into the city treasury during the same period on account of the several divisions of the Street Department:

Paving Division	\$75,867 60
Sewer Division	87,207 65
Sanitary Division	28,969 27
Bridge Division	2,699 50
Street-Cleaning Division	2,748 27
Boston and Cambridge Bridges	752 68
Street-Watering	704 52
	<u>\$198,949 49</u>

List of Contracts from February 1, 1893, to January 31, 1894, made by the Street Department.

Paving Blocks.

CONTRACT.	Awarded to	Proposal received.	Price per M.
Large paving blocks, 300,000 . . .	Rockport Granite Co ,	April 12, 1893.	\$73 50 delivered on wharves.

Paving Bricks.

CONTRACT.	Awarded to	Proposal received.	(A.) 100,000 on wharves.	(B.) 100,000 on streets in South and East Boston, Charlestown, and City Proper.	(C.) 100,000 on streets in Brighton, West Roxbury, Dorchester, and Roxbury.
Paving bricks, 300,000 . . .	Ham & Carter	April 5, 1893.	\$12.00 per M.	\$13.00 per M.	\$13.50 per M.

North-River Flagging.

CONTRACT.	Awarded to	Proposal received.	Price per Sq. Ft.	
North-River flagging, city .	J. J. Cuddihy . . .	March 13, 1893.	\$0 35½ on wharves.	\$0 40 on streets.

Spruce Lumber.

CONTRACT.	Awarded to	Proposals received.	Price per M Ft. B. M.	Price for Planing per M ft.
Spruce lumber, Dists. 1, 2, 3, 8, 9, and 10 .	John W. Leatherbee,	Feb. 20, 1893.	Dists. 1, 8, 9, and 10, \$16.00; Dist. 2, \$16.90; Dist. 3, \$16.40.	\$1 00
Spruce lumber, Dists. 5, 6, and 7	Otis Eddy	" " 1893.	Dist. 5, \$16.25; Dists. 6 and 7, \$16.00.	1 00
Spruce lumber, Dist. 4	Curtis & Pope . . .	" " 1893.	\$16.38	1 50

Beach Gravel.

CONTRACT.	Awarded to	Proposal received.	Price per Ton.
Beach gravel, city	Hugh Farrell	March 13, 1893.	\$0 67 delivered on wharves.

Coal.

CONTRACT.	Awarded to	Proposals received.	Price per Ton of 2,240 lbs.
Coal (1,000 tons), Pumping- Station (Dorchester) . . .	J. A. Bradford & Co. .	Feb. 14, 1893.	\$4 58
Coal (1,500 tons), Pumping- Station (Dorchester) . . .	Thomas & Pike	May 6, 1893.	3 82
Coal (2,000 tons), Pumping- Station (Dorchester) . . .	" " "	Sept. 2, 1893.	3 84

Cement.

CONTRACT.	Awarded to	Proposal received.	American Cement.	
			Delivered in South and East Boston, Charles- town, and City Proper.	Delivered in West Rox- bury, Brighton, Dor- chester, and Roxbury.
Cement . . .	Ham & Car- ter	Mar. 22, 1893.	\$1.10 per bbl.	\$1.12 per bbl.
			Portland Cement.	
			Delivered in South and East Boston, Charles- town, and City Proper.	Delivered in West Rox- bury, Brighton, Dor- chester, and Roxbury.
			\$2.20 per bbl.	\$2.25 per bbl.

Iron Castings.

CONTRACT.	Awarded to	Proposal re- ceived.	Price per 100 lbs.
Iron Castings	Mechanics' Iron Foundry . . .	March 27, 1893.	\$1 74

Street-Watering.

CONTRACT.	Awarded to	Proposals received.	Price.
Street-watering, Back Bay District	M. E. Nawn	Jan. 23, 1893 . . .	Salt water, \$800.00 per mile per year for two years; fresh water, \$575.00 per mile per year for two years.
Street-watering, South End District	O. Nute & Son	Jan. 23, 1893 . . .	Salt water, \$630.00 per mile per year for two years; fresh water, \$460.00 per mile per year for two years.
Street-watering, Louisburg Sq.	Benjamin B. Williams, for the Abutters	June 9, 1893 . . .	\$100 per season paid to city.

Refuse Cans.

CONTRACT.	Awarded to	Proposal received.	Price per Ton.
Refuse Cans, City dumps	O'Connor Bros.	Feb. 14, 1893 . . .	\$3.50 paid to city.

Bridge-Strengthening, etc.

CONTRACT.	Awarded to	Proposal received.	Price.
Repairing fender-guard, Congress-st. Bridge	Josiah Shaw	Jan. 18, 1893 . . .	\$1,382.00.
Sale of "Down Stream" draw, Dover-st. Bridge	W. H. Wyman	Aug. 7, 1893 . . .	\$337.00 paid to city.
Strengthening Broadway Bridge	William L. Miller	Sept. 28, 1893 . . .	\$5,337.00.
Rebuilding fender-guard, Craigie's Bridge	William L. Miller	May 31, 1893 . . .	\$2,247.00.

Pile Bulkhead.

CONTRACT.	Awarded to	Proposal received.	Price.
Pile bulkhead, Commonwealth ave.	John T. Scully	June 30, 1893 . . .	\$830.50.

Lease of Land, etc.

CONTRACT.	Lessor.	Proposals received.	Terms.
Lease of flats and dock for public landing, E. Boston,	East Boston Dry Dock Co. . .	Dec. 10, 1892 . . .	\$250.00 per annum; payable quarterly.
Lease of land, Revere st.	James J. Costello	Sept. 1, 1893 . . .	\$200.00 per month for five months.

Building Public Landing.

CONTRACT.	Awarded to	Proposal received.	Price.
Building public landing, East Boston	R. F. Keough	April 12, 1893 . .	\$250.00.

Lease of Barney Automatic Dumping-Boat.

CONTRACT.	Lessor.	Proposal received.	Rental.
Lease of Barney Automatic Dumping-Boat	Barney Dumping-Boat Co. . .	April 13, 1893 . .	\$15.00 per day.

Quarrying, Cutting, and Delivering Stone.

CONTRACT.	Awarded to	Proposals received.	Terms.
Quarrying, crushing, and delivering stone from Savin Hill ave.	John McMorrow	April 14, 1893 . .	(A) \$1.50 per ton of 2,000 lbs. delivered on streets in Dorchester within a mile and a half haul of crusher; (B) \$1.75 per ton of 2,000 lbs. delivered on streets in South Boston. \$1.75 per cubic yard delivered at Chestnut Hill-ave. crusher, in sizes to fit the jaws of the crusher. \$1.75 per cubic yard delivered at Washington-st. (Roslin-dale) crusher, in sizes to fit the jaws of the crusher.
Blasting rock, Commonwealth ave., cor. Sidlaw road,	A. McMurtry	Nov. 20, 1893 . .	
Blasting rock on La Grange st., Ward 23	James Doonan	Oct. 18, 1893 . .	

Teaming Crushed Stone.

CONTRACT.	Awarded to	Proposals received.	Prices.
Teaming crushed stone from Tremont-st. crusher . .	P. F. Donovan	May 22, 1893 . .	\$0.22½ per ton within radius of 1 mile; \$0.29 per ton between 1 and 2 miles.
Teaming crushed stone from Heath-st. crusher to streets in Back Bay, between Arlington st. and W. Chester Park	William Finneran	April 12, 1893 . .	

Barring up and Removing Cobble Paving.

CONTRACT.	Awarded to	Proposals received.	Price.
Barring up and removing cobble-paving from South Margin st. to E. Boston Paving Yard, cor. Marion and Morris sts.	Jeremiah J. Sullivan	Aug. 9, 1893 . .	\$0.24 per square yard.
Barring up and removing stone-paving from Exchange st. to E. Boston Paving Yard, cor. Marion and Morris sts.	Jeremiah J. Sullivan	Aug. 23, 1893 . .	\$0.24 per square yard.

Filling.

CONTRACT.	Awarded to	Proposals received.	Price per cubic yard.
Howell street	Collins & Ham	January 22, 1893	\$0 30
Rawson street	O. Nawn	June 19, 1893	0 50
Batavia street	E. A. Janse	June 25, 1893	0 38
Miner street	James Killian	July 31, 1893	0 79
Commonwealth avenue	R. A. Davis	September 13, 1893	0 63
Commonwealth avenue	Boston Contracting Company . .	October 30, 1893	0 41
Vale street	Frank Hannon	May 16, 1893	0 27
Commonwealth avenue	Boston Contracting Company . .	July 24, 1893	{ Extension of contract -- \$0.37 per cubic yard, measured in bank.
Commonwealth avenue	{ Seaneau, Worthley, and Gibbs, Trustees	July 24, 1893	

{ Extension of contract -- \$0.37 per cubic yard, measured in bank.
\$0.12½ per cu. yd., measured in bank.

Retaining-Walls.

CONTRACT.	Awarded to	Proposals received.	Bid per Wall.
Miner street	J. Sutherland	October 19, 1893	No. 1, \$875.90; No. 2, \$1,298.35.
Washington and Albano streets	James Doonan	June 12, 1893	\$4.25 per perch.
Howell street	Collins & Ham	April 14, 1893	{ Earth excavation, lump sum, \$25.00; rubble masonry in wall, \$4.00 per cu. yd.; capping-stone, \$1.75 per lin. ft.
Howell street	Michael Doyle	May 12, 1893	\$230, lump sum.

Furnishing and Laying Concrete Base.

CONTRACT.	Awarded to	Proposals received.	Price per cubic yard.
Furnishing and laying concrete base, Dwight street	Metropolitan Construction Company . . .	August 8, 1893	\$5 00
Furnishing and laying concrete base, Exchange street	Metropolitan Construction Company . . .	August 30, 1893	5 00
Furnishing and laying concrete base, Beacon street, G. to W. C. Pk. . .	Metropolitan Construction Company . . .	September 6, 1893	5 00
Furnishing and laying concrete base, Parmenter street	Metropolitan Construction Company . . .	September 20, 1893 . . .	5 00

Street-Building under New Law, Chap. 323, Acts of 1891, as Amended by Chap. 418, Acts of 1892.

CONTRACT.	Awarded to	Proposals received.	Prices.
Constructing and regulating a Macadam roadway in Batavia st., St. Stephen st.	James Grant & Co.	Sept. 20, 1893. . . .	(A) \$0.25; (B) \$0.65; (C) \$0.45; (D) \$2.40; (F) \$0.84; (G) \$1.05; (H) \$4.95; (I) \$100.00; (L) \$1.35.
Constructing and regulating a Macadam roadway in Bay State Road, Riteigh st. to Sherborn st.	James Killian	Sept. 20, 1893. . . .	(A) \$0.35; (C) \$0.48; (D) \$2.60; (F) \$0.98; (G) \$0.46; (H) \$1.20; (L) \$0.84.
Constructing and regulating a Macadam roadway in Deerfield st., Commonwealth ave. to Charles River, Constructing and regulating a Macadam roadway in Miner st., Beacon st., to Brookline Branch, B. & A. R.R.	James Killian Doherty & O'Leary	Sept. 20, 1893. . . . Sept. 20, 1893. . . .	(A) \$0.35; (C) \$0.47; (D) \$2.60; (F) \$0.97; (G) \$0.46; (H) \$1.20; (L) \$0.84. (A) \$0.30; (B) \$0.80; (C) \$0.25; (D) \$2.31; (F) \$1.11; (G) \$1.25; (H) \$3.95; (L) \$1.17½.

EXPLANATION OF LETTERS.

- (A) — Price per cu. yd. for grading and preparing roadways and sidewalks.
 (B) — Price per sq. yd. for furnishing and placing Telford base.
 (C) — Price per sq. yd. for furnishing and placing the crushed stone and binder.
 (D) — Price per sq. yd. for furnishing blocks and paving gutters.
 (F) — Price per lin. ft. for furnishing and setting edgestones.
 (G) — Price per sq. yd. for furnishing bricks and laying sidewalks.
 (H) — Price per sq. yd. for furnishing and laying crosswalks.
 (L) — Price per cu. yd. for furnishing gravel.

Collecting and Removing Ashes.

CONTRACT.	Awarded to	Proposals received.	Prices.
Collecting and removing ashes in South Boston . . .	F. J. Mohan	January 24, 1893.	\$5,750 per year for two years.
Collecting and removing ashes in Dorchester District,	John Bradley	March 27, 1893.	\$4,100 per year for two years.
Collecting and removing ashes, in W. Roxbury Dist.,	James Doonan	March 27, 1893.	\$5,850 per year for two years.

Paving with Trinidad Asphalt.

CONTRACT.	Awarded to	Proposals received.	Price per square yard.
Paving with Trinidad Asphalt, Arch st.	Barber Asphalt Paving Co. . .	June 1, 1893 . . .	\$2.25.
Paving with Trinidad Asphalt, Parmenter st.	Barber Asphalt Paving Co. . .	Sept. 11, 1893 . . .	\$2.25.
Paving with Trinidad Asphalt, Beacon st., Gloucester to West Chester park	Barber Asphalt Paving Co. . .	Sept. 27, 1893 . . .	\$2.25.

Paving with Sicilian Rock Asphalt.

CONTRACT.	Awarded to	Proposals received.	Price per square yard.
Paving with Sicilian rock asphalt, Dwight st.	H. Gore & Co.	Aug. 8, 1893 . . .	\$2.25.
Paving with Sicilian rock asphalt, Broadway	H. Gore & Co.	Oct. 3, 1893 . . .	¹ \$3.75.

¹ Excavating and removing material, etc., and furnishing and laying concrete base.

Constructing and Regulating a Telford Macadam Roadway.

CONTRACT.	Awarded to	Proposals received.	Price.
Constructing and regulating a Telford macadam roadway in Commonwealth Ave., Beacon st. to Granby st. . .	Robert A. Davis	April 20, 1893 . .	(A) \$0.30; (B) \$0.95; (D) \$0.95; (E) \$0.50; (F) \$0.45; (H) \$1.20; (I) \$1.00; (J) \$0.50.
Constructing and regulating a Telford macadam roadway in Commonwealth ave., 1,700 lin. ft. west from easterly side of Granby st.	F. H. Cowin & Co.	July 10, 1893 . . .	(A) \$0.30; (B) \$0.79; (D) \$0.85; (E) \$0.55; (F) \$0.45; (H) \$1.15; (I) \$1.02; (J) \$0.48.

EXPLANATION OF LETTERS.

- A — Price per cubic yard for grading and preparing roadway, sidewalks and planting spaces.
 B — Price per square yard for furnishing and placing Telford base.
 D — Price per square yard for paving gutters.
 E — Price per square yard for placing loam on planting spaces.
 F — Price per lineal foot for setting edgestones.
 H — Price per square yard for laying crosswalks.
 I — Price per lineal foot for building a plank sidewalk.
 J — Price per lineal foot for building fence.

Sewer Construction under Chap. 323, Acts of 1891, as amended by Chap. 418, Acts of 1892.

CONTRACT.	Awarded to	Proposals received.	Prices.
Sewer and connections, Batavia st.	Stephen Connelly	June 7, 1893 . . .	\$1.75 per lin. ft. earth excavation and refill for 30 X 36-in. brick sewer; \$0.55 per lin. ft. earth excavation and refill for 10-in. catch-basin and 6-in. house-drain; \$5.25 per cubic yd. brick masonry, Am. cement; \$6.00 per cubic yd. brick masonry, Port. cement; \$5.00 per cubic yd. concrete; \$28.00 per M ft. B.M. spruce lumber; \$0.20 per lin. ft. earth excavation and refill for 8-in. pipe underdrain; \$2.55 per spruce pile driven; \$0.15 per pipe connections.

Sewer and connections, Bay State road	D. O'Connell	July 1, 1893 . . .	\$3.07 per lin. ft. earth excavation and refill for 30 X 36 in. brick sewer; \$1.80 per lin. ft. earth excavation and refill for 18-in. pipe sewer; \$2.00 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$0.85 per lin. ft. earth excavation and refill for 6-in. house and 10-in. catch-basin drain; \$0.95 per lin. ft. earth excavation and refill for 15-in. catch-basin drain; \$0.90 per lin. ft. earth excavation and refill for 12-in. catch-basin drain; \$5.25 per cubic yd. brick masonry, Am. cement; \$3.25 per cubic yd. concrete; \$40.00 per M ft. B.M. spruce lumber; \$0.20 per lin. ft. earth excavation and refill for 8-in. pipe underdrain; \$0.10 per pipe connections; \$65.00 per drop inlet; \$75.00 per catch-basin.
Sewer and connections, Deerfield st.	D. O'Connell	July 1, 1893 . . .	\$2.18 per lin. ft. earth excavation and refill for 18-in. pipe sewer; \$0.95 per lin. ft. earth excavation and refill for 10-in. catch-basin drain; \$40.00 per manhole; \$90.00 per catch-basin.
Sewer and connections, Miner st.	D. O'Connell	June 7, 1893 . . .	\$1.17 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$0.85 per lin. ft. earth excavation and refill for 6-in. house and 10-in. catch-basin drain; \$37.50 per manhole; \$75.00 per catch-basin.

Constructing Sewers.

UNDER GENERAL LAW.		CONTRACT.		Price.	
CONTRACT.		Awarded to		Proposals received.	
Sewer and connections, Centre st.		W. T. Davis	May 26, 1893 . . .	\$1.20 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$40.00 per manhole.	
Sewer and connections in private land between Rockwell and Stockton sts.		H. P. Nawn	Aug. 28, 1893 . . .	\$2.40 per lin. ft. earth excavation and refill for 18-in. pipe sewer; \$16.00 per manhole.	
Sewer and connections, Whitfield st. and private land,		Stephen Connelly	Aug. 28, 1893 . . .	\$1.05 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$16.00 per manhole.	
Sewer and connections, Harvard st., Dorchester . . .		W. T. Davis	Oct. 16, 1893 . . .	\$1.25 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$47.00 per manhole.	
Sewer and connections, Brown ave., Roslindale . . .		James Dolan	Oct. 17, 1893 . . .	\$1.24 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$40.00 per manhole; \$4.00 per cubic yd. for rock excavation.	
Sewer and connections, E st., South Boston		John W. Bowers	Oct. 17, 1893 . . .	\$1.00 per lin. ft. earth excavation and refill for 15-in. pipe sewer; \$40.00 per manhole.	
Sewer and connections, Faulkner st., Dorchester . . .		D. O'Connell	Oct. 18, 1893 . . .	\$1.10 per lin. ft. earth excavation and refill for 12 in. pipe sewer; \$40.00 per manhole.	

Constructing Sewers, etc. — *Concluded.*

CONTRACT.	Awarded to	Proposals received.	Price.
Outlet for above-named sewer across private land . .	D. O'Connell	Oct. 18, 1893 . . .	\$1.15 per lin. ft. earth excavation and refill for 15-in. pipe sewer; \$40.00 per manhole; \$5.50 per cubic yd. for concrete.
Sewer and connections, Freeman st., Dorchester . . .	D. O'Connell	Nov. 18, 1893 . . .	\$1.10 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$40.00 per manhole.
Sewer and connections, Albano st., Ward 23	James Dolan	Dec. 23, 1893 . . .	\$1.10 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$35.00 per manhole.
Sewer and connections, Disson st., Dorchester . . .	D. O'Connell	Dec. 23, 1893 . . .	\$1.10 per lin. ft. earth excavation and refill for 12 and 15 in. pipe sewers; \$55.00 per manhole.
Sewer and connections, Heath st.	E. A. Davis	Dec. 23, 1893 . . .	\$1.25 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$40.00 per manhole.
Sewer and connections, Howe st.	D. F. O'Connell	Dec. 23, 1893 . . .	\$1.10 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$40.00 per manhole; \$5.00 per cu. yd. rock excavation.
Sewer and connections, Neponset ave.	D. O'Connell	Dec. 23, 1893 . . .	\$1.20 per lin. ft. earth excavation and refill for 15-in. pipe sewer; \$1.10 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$40.00 per manhole.
Sewer and connections, Spring st., Brighton	W. T. Davis	Dec. 23, 1893 . . .	\$0.90 per lin. ft. earth excavation and refill for 15-in. pipe sewer; \$4.00 per cu. yd. rock excavation; \$35.00 per manhole.
Sewer and connections, Prince st.	M. Kiernan	Dec. 23, 1893 . . .	\$1.20 per lin. ft. earth excavation and refill for 15-in. pipe sewer; \$1.10 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$5.00 per cu. yd. rock excavation; \$40.00 per manhole.
Sewer and connections, Pond st.	W. T. Davis	Dec. 23, 1893 . . .	\$1.60 per lin. ft. earth excavation and refill for 24-in. pipe sewer; \$1.40 per lin. ft. earth excavation and refill for 15-in. pipe sewer; \$1.20 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$5.00 per cu. yd. rock excavation; \$35.00 per manhole.
Sewer and connections, Market st., Ward 25	W. T. Davis	Dec. 23, 1893 . . .	\$1.60 per lin. ft. earth excavation and refill for 18-in. pipe sewer; \$4.00 per cu. yd. rock excavation; \$60.00 per manhole.
Sewer and connections, Park st., Dorchester	E. A. Davis	Dec. 23, 1893 . . .	\$1.40 per lin. ft. earth excavation and refill for 18-in. pipe sewer; \$40.00 per manhole.
Sewer and connections, Johnston st., W. Roxbury . .	W. T. Davis	June 27, 1893 . . .	\$1.25 per lin. ft. earth excavation and refill for 10-in. pipe sewer; \$40.00 per manhole.
Sewer and connections, Amherst st., Ward 23	James Dolan	July 8, 1893 . . .	\$0.95 per lin. ft. earth excavation and refill for 10-in. pipe sewer; \$4.00 per cu. yd. rock excavation; \$40.00 per manhole.

Sewer and connections, Dewey st., Ward 21	W. T. Davis	May 26, 1893 . . .	\$1.25 per lin. ft. earth excavation and refill for 12-in. pipe sewer; \$6.00 per cu. yd. rock excavation; \$55.00 per manhole
Sewer and connections, Commonwealth ave., Brighton	Metropolitan Construction Co.	Jan. 23, 1894 . . .	\$1.00 per lin. ft. for earth excavation and refill for 12-in. pipe sewer; \$40.00 per manhole.
Sewer and connections, Mt. Vernon st., Ward 23	James Dolan	Jan. 5, 1894 . . .	\$1.25 per lin. ft. for earth excavation and refill for 12 and 15 in. pipe sewer; \$40.00 per manhole.
Sewer and connections, Market st., Brighton	Metropolitan Construction Co.	Dec. 28, 1893 . . .	\$1.00 per lin. ft. for earth excavation and refill for 15-in. pipe sewer; \$50.00 per manhole.
Sewer and connections, Story st., South Boston	John W. Bowers	Jan. 5, 1894 . . .	\$1.25 per lin. ft. for earth excavation and refill for 12-in. pipe sewer; \$40.00 per manhole.
Sewer and connections, Surbridge st.	D. O'Connell	Jan. 5, 1894 . . .	\$1.25 per lin. ft. for earth excavation and refill for 15-in. pipe sewer; \$35.00 per manhole.
Sewer and connections, Wexford st.	Metropolitan Construction Co.	Dec. 28, 1893 . . .	\$1.00 per lin. ft. earth excavation and refill for 12 and 15 in. pipe sewer; \$50.00 per manhole.
Sewer and connections, Sanford st., Ward 24	D. F. O'Connell & Co.	Jan. 5, 1894 . . .	\$1.10 per lin. ft. earth excavation and refill for 18 and 12 in. pipe sewer; \$35.00 per manhole.

Miscellaneous Agreements.

CONTRACT.	Awarded to	Proposals received.	Price.
Excavating and removing earth and rock from Whitling st., Ward 20	John J. Nawn	Dec. 14, 1893 . . .	Earth, \$1.00 per cubic yd.; rock, \$2.00 per cubic yd.
Furnishing crushed stone on Commonwealth ave.	O. Nawn	Oct. 7, 1893 . . .	\$2.25 per cubic yd.
Furnishing Telford base on Commonwealth ave.	Michael Kiernan	Sept. 11, 1893 . . .	\$0.80 per sq. yd.
Sub-grading, Stockton st.	H. P. Nawn	Nov. 3, 1893 . . .	\$0.50 per cubic yd.
Cable-houses on bridges. Craigie's and W. Boston bridges (Boston and Cambridge Bridges)	N. E. Tel. & Tel. Co.	April 15, 1893 . . .	\$100 per year per bridge.
Iron fence for L-st. bulkhead	Geo. T. McLaughlin & Co.	Nov. 6, 1893 . . .	\$276.00.
Paving with pitch joints, Beacon st., from Tremont st. and Somerset st.	F. H. Cowin & Co.	May 13, 1893 . . .	\$0.70 per sq. yd.
Teaming blockstone and edgestone from South End Paving Yard. (Albany st.) to Peter Parley Road	William Finneran	July 11, 1893 . . .	\$5.50 per 1,000 for blockstone, and \$0.05 per lin. ft. for edgestone.

EMPLOYMENT OF LABOR.

During the year ending February 1, 1894, 47 applications were made upon the Civil Service Commission for 103 employees of various grades, and 185 names were submitted by them, of which number 107 were given employment in the several divisions.

The department records show that there are 2,520 persons eligible for employment in the various divisions, and of that number 2,189 were upon the pay-rolls ending January 25, 1894.

The following table shows the classification of all employees of the Street Department as at present organized •

Grade and Number of Employees in the Street Department.

TITLE.	DIVISIONS.						Total.
	Central Office.	Paving.	Sewer.	Sanitary.	Street Cleaning.	Bridge.	
Superintendent	1	.....	.....	.....	.....	.....	1
Deputy superintendents	1	1	1	1	1	5
Executive engineer	1	.....	.....	.....	.....	.....	1
Purchasing agent and assistant	2	.....	.....	.....	.....	.....	2
Clerks	1	7	5	5	1	1	20
Foremen	12	10	4	11	3	40
Sub-foremen	25	11	5	12	.....	53
Inspectors	13	24	2	.....	.....	39
Civil engineers	3	.....	.....	.....	3
Draughtsmen	11	.....	.....	.....	11
Transitmen	2	2	.....	.....	.....	4
Levelmen	3	5	.....	.....	.....	8
Rodmen	4	16	.....	.....	.....	20
Aids	2	.....	.....	2
Blacksmiths and assistants	16	1	5	2	.....	24
Bracers	14	.....	.....	.....	14
Bridge-cleaners	5	5
Boys	22	.....	.....	1	23
Captain	1	.....	.....	1
Carpenters and assistants	20	7	.....	2	16	45
Coal-passers	5	.....	.....	.....	5
Draw-tenders	20	20
Assistant draw-tenders	30	30
Deck-hand	1	.....	.....	.....	1
Dumpers	15	7	.....	22
Engineers and assistants	14	16	.....	.....	13	43
Feeders	4	.....	.....	4
Firemen	6	.....	.....	.....	6
Gate-men	3	.....	.....	.....	3
Harness-makers	2	.....	3	.....	.....	5
<i>Carried forward</i>	5	119	163	47	36	90	400

Grade and Number of Employees, etc.— *Concluded.*

TITLE.	DIVISIONS.						Total.
	Central Office.	Paving.	Sewer.	Sanitary.	Street Cleaning.	Bridge.	
<i>Brought forward</i>	5	119	163	47	36	90	460
Helpers				195	61		256
Horse-shoers				4			4
Hostlers			2			1	3
Janitors			2				2
Laborers		437	348		141	1	927
Ledgemen			6				6
Machinists			2				2
Masons (stone and brick)			32				32
Masons' tender			1				1
Measurers		2					2
Messengers	2	5	4	4	2	4	21
Oilers			5				5
Patch pavers and assistants		34					34
Painters		1		2	1	2	6
Pilot			1				1
Pipe-layers			2				2
Powdermen		4					4
Riggers			2				2
Stablemen		13	2	8	5		28
Steam-drillers		7					7
Steward			1				1
Stone-cutters		11	7				18
Store-keeper			1				1
Teamsters		68	12	158	61	2	301
Watchmen		10	11	5	2	3	31
Weighers		3					3
Wharfingers		4	1				5
Wheelwrights				2			2
Yardmen		9	2	10	1	1	23
Totals	7	727	607	435	310	104	2,190

COMPLAINTS.

Fewer complaints have been received during the last year than at any time since the organization of the department; the majority were in relation to the non-removal of ashes when the yards and alleys were blockaded with snow. A noticeable feature of the list is the freedom from complaints as to the uncleanness of streets, there having been but seven for the entire year.

This shows how an appreciative public welcomes the extra efforts that have been made continuously for the past three years to clean up and remove the street litter as often as possible.

A number of complaints find their way to this office that should have been sent to the Board of Police. It may be stated that the Superintendent of Streets is not responsible for violations of city ordinances, and that in cases of refuse or obstructions left unlawfully in a public way, it is the privilege and duty of all good citizens to promptly report the same to the Board of Police, as the Superintendent of Streets is obliged to refer all such matters to this board when called to his attention.

It may also be said that alleys and private ways are not under the jurisdiction of the Street Department; and the filthy, unsanitary, or neglected condition of them can only find redress through the Board of Health or through the courts.

The same decrease in complaints is shown in the street-watering returns. If due allowances are made at the beginning and end of a season for the non-watering of streets during low temperature, owing to the impossibility of keeping the water turned on in the post-hydrants, and also for the very sudden changes in the humidity of the atmosphere, dropping from the average of seventy-five points to thirty-five points, or sixty-five points below saturation, all of which conditions render perfect and satisfactory work impossible, we may fairly conclude that the streets were much better watered than ever in the history of Boston, and that if any cause of complaint remained, it lay in the fact that the annual appropriation for this work is not sufficient to water all side streets, as was shown in the department estimates.

Whole number of complaints 129

Distributed as follows :

Paving Division	24
Sewer Division	4
Sanitary Division	73
Street-Cleaning Division	7
Bridge Division	5
Street-Watering	16

BRIDGE DIVISION.

The establishment of two districts in the Bridge Division, one known as the Northern District, including all bridges north and west of the Charles river, and the other known as the Southern District, with headquarters at Foundry street, including all bridges south of the Charles river, each division being in charge of a foreman, has continued to give satisfactory results.

With the exception of the closing of the Charles-river bridge from time to time, due to the need of frequent repairs, owing to its worn-out condition, no delay has been occasioned to the travelling public by the breaking down of draw-bridges during the past year.

There are twelve important tide-water bridges under the care of the Bridge Division. Of these bridges, seven are operated by steam-power; viz., Chelsea North, Chelsea South, Charles river, Warren, L street, and Broadway. Meridian street is operated by horse power. Malden, Mt. Washington avenue, and Dover street (foot-bridge) are worked by hand power, and Federal-street bridge is operated by electric power.

A comparison of the cost of maintenance of the steam, horse, and electric power in use, shows that electricity is by far the cheapest motive power. As Federal-street bridge, which is operated by electric power, is one of the most important bridges with sufficient work to test it under all conditions, the highly satisfactory results that have been attained at this bridge show that electricity not only is the cheapest power in use on the bridges, but is also the best.

Several radical changes in bridges have been undertaken during the year, among which the most important are the rebuilding of Dover-street and Chelsea-street bridges, abolishing the grade crossing at these streets, the strengthening of Broadway bridge to permit the passing of electric cars, and the alteration of the West Chester-park bridge over the Boston & Albany Railroad, to remove the objectionable crown of the bridge, which interfered with travel and with the appearance of the street. The reconstruction of Chelsea-street bridge has been undertaken under the "Act to abolish grade crossings on Chelsea bridge and Chelsea-bridge avenue," which is as follows:

CHELSEA BRIDGE.

[CHAPTER 374.]

AN ACT RELATING TO THE ABOLITION OF GRADE CROSSINGS OF CHELSEA BRIDGE AND CHELSEA-BRIDGE AVENUE IN THE CITY OF BOSTON.

Be it enacted, etc., as follows:

SECTION 1. Upon petition of the mayor and aldermen of the city of Chelsea, the Superior Court, or any justice thereof sitting in equity for the County of Suffolk, after such notice by public advertisement or otherwise as the court shall deem desirable, and a hearing, shall appoint, according to its discretion, a commission of three disinterested persons not residents of the county of Suffolk, who shall, after due notice and a hearing, prescribe the alterations and improvements necessary to abolish or overcome all grade crossings on that part of Chelsea bridge or Chelsea-bridge avenue crossing Mystic river in Boston in said county.

SECT. 2. The said commission shall prescribe the manner and limits within which such alterations and improvements shall be made, and shall further determine how the work shall be done; and if said commission shall decide that said grade crossings shall be abolished or overcome by carrying the highway by a bridge or superstructure over the present railroad crossings on said bridge or avenue, it may discontinue the present highway under such bridge or superstructure, except so far as the use of the same may be required for the proper and convenient construction, maintenance, alteration, and repair of said overhead structure and the foundation and support thereof and of any reconstruction of the same: *provided, however*, that the Lynn & Boston Railroad Company and the Boston & Chelsea Railroad Company shall have the same rights in any superstructure that may be erected hereunder as they have in the present bridge and roadway.

SECT. 3. The Lynn & Boston Railroad Company, subject to the approval of the board of harbor and land commissioners, may build a temporary bridge or bridges, upon which bridge or bridges it may run its cars while said alterations and improvements are being made, and it shall primarily pay all the expenses thereof, including those of removal, and be liable for all damages arising in consequence thereof.

SECT. 4. The Boston & Maine Railroad shall carry out such alterations and improvements as said commission shall prescribe, and do all the work required therein; and of the cost incurred by said Boston & Maine Railroad in doing said work and making said alterations and improvements, as audited and approved by the auditors provided for in chapter four hundred and twenty-eight of the acts of the year eighteen hundred and ninety, including in such cost the cost of the hearing and the compensation of the commissioners and auditors for their services, and including also damages mentioned in section five of chapter four hundred and twenty-eight of the acts of the year eighteen hundred and ninety and in all acts in addition thereto or in amendment thereof, and including further all expenses of the Lynn & Boston Railroad Company in changing its tracks to said superstructure and in building said temporary bridge, five per centum shall be repaid to said Boston & Maine Railroad by said Lynn & Boston Railroad Company, and thirty per centum shall be repaid to said Boston & Maine Railroad by the Commonwealth, in the same manner and from the same funds that money is paid by the Commonwealth under the provisions of chapter four hundred and twenty-eight of the acts of the year eighteen hundred and ninety; and of the amount so repaid to said Boston & Maine Railroad by the Commonwealth, eighteen per centum shall be repaid to the Com-

monwealth by each of said cities of Boston and Chelsea, in three equal annual payments of six per centum of said amount.

SECT. 5. Six per centum of the total amount to be repaid to the Commonwealth by the cities of Boston and Chelsea, as provided in the preceding section, shall be included in and made a part of the sum charged to each of the cities of Boston and Chelsea for each of the ensuing three years, and shall be assessed upon them in the apportionment and assessment of their annual state tax. The state treasurer shall in each of said three years notify each such city of the amount of such assessment, which amount shall be paid by the city into the treasury of the Commonwealth at the time required for the payment, and as a part of its state tax.

SECT. 6. Sections four to twelve, inclusive, of chapter four hundred and twenty-eight of the acts of the year eighteen hundred and ninety, and all acts in addition thereto or in amendment thereof, shall be applicable to all proceedings under this act, so far as they shall not conflict with the provisions of this act: *provided, however*, that all damages occasioned by the taking of land, whether by either city or said railroad company, shall primarily be paid by said railroad company.

SECT. 7. This act shall take effect upon its passage.

[*Approved June 14, 1892.*]

October 5, 1892. The Mayor and Aldermen of the City of Chelsea petitioned the Superior Court in Equity for the appointment of a commission "to prescribe the alterations and improvements necessary to abolish or overcome all grade crossings on that part of Chelsea bridge crossing Mystic river in Boston, Suffolk county," in accordance with Chapter 374, Acts of 1892.

The court appointed Messrs. George F. Tucker, E. D. Hayden, and A. H. Wright as the commissioners prayed for. After giving several hearings, at which representatives were present from the cities of Chelsea and Boston, Boston & Maine Railroad, Lynn & Boston Railroad Company, and the Boston & Chelsea Railroad Company, they submitted the following finding:

Description.

The grade of the highway shall be so raised that the said highway shall pass over the tracks of the Boston & Maine Railroad.

The limits within which the said alterations shall be made shall be as follows: Beginning at a point in Chelsea street in the city of Boston, in a continuation of the southerly line of Scott court, then northerly along the easterly side of Chelsea street, Chelsea avenue, and Chelsea bridge, a distance of 2,777 feet, to a point 188 feet southerly from the southerly end of the drawbridge at the main channel of the Mystic river. The above-described line shall be the easterly side line of the street as altered and improved.

The grade of the street as altered and improved shall be as follows: Beginning at the southerly end of the present grade of Chelsea street the grade shall rise at a rate not exceeding 3 feet per 100 feet, for a distance of 449 feet to the southerly end of the south drawbridge; thence on a level grade of 36 feet above the city base to the northerly end of said drawbridge; thence with a rise not exceeding 1.5 feet per 100 feet to a height of 38 feet above the city base; thence level 1,100 feet; thence with a fall of 3 feet per 100 feet to a point about 188 feet from the south end of the drawbridge over the main channel of the Mystic river.

This grade line as described shall be the grade of the centre of the driveway, except that it shall be softened at all intersections by vertical curves.

And they also declare in their report "that a safe and convenient way for public travel shall be provided outside the limits of the present street across lands of the Boston & Maine Railroad, and the same kept open so long as it can be without interfering with the completion of the alterations ordered."

This temporary structure is in process of construction, that part being already built which commences at the northerly end of the south drawbridge and extends to the extreme northerly end of the proposed new structure. Work is also being rapidly pushed on the temporary drawbridges.

The full text of the finding is as follows:

COMMONWEALTH OF MASSACHUSETTS.

SUPERIOR COURT.

SUFFOLK, SS.

IN EQUITY, 1893.

In the matter of the petition of the Mayor and Aldermen of the city of Chelsea for the appointment of a commission to prescribe the alterations and improvements necessary to abolish or overcome all grade crossings on that part of Chelsea bridge or Chelsea-bridge avenue, crossing Mystic river in Boston in the County of Suffolk, in accordance with Chapter 374, Acts of 1892.

REPORT AND FINDING OF SPECIAL COMMISSION.

In the above-entitled matter, the undersigned, George F. Tucker, E. D. Hayden, A. H. Wright, duly appointed by the Superior Court sitting in equity, in Boston, in and for said County of Suffolk, on the 5th day of October, A.D. 1892, on a commission for the purpose prayed for in said petition hereto annexed, having given due notice to all parties interested in the matter of said petition that they would meet at the City Hall in Chelsea on Tuesday, the 17th day of December, then next, at ten o'clock in the forenoon, to hear all parties interested, said notice

being given, by due service thereof, on the city of Boston, the city of Chelsea, the Boston & Maine Railroad, the Lynn & Boston Railroad Company, and the Boston & Chelsea Railroad Company, and also by publication three weeks successively in the newspapers called the "Boston Journal" and "Chelsea Evening Record"; and in pursuance of said order and notice, the commissioners met at the City Hall in Chelsea at ten o'clock in the forenoon of Tuesday, the seventeenth day of January, A.D. 1893, and the following-named parties, interested in the matter of the aforesaid petition, appeared before them, to wit: The petitioners, the Mayor and Aldermen of the city of Chelsea, by City Solicitor Fitz; the city of Boston, by Assistant City Engineer Cheney; the Boston & Maine Railroad, by Chief Engineer H. Bissell; the Lynn & Boston Railroad Company, and the Boston & Chelsea Railroad Company, by Messrs. Proctor and Warren; and it was shown and duly appeared that due notice of the time, place, and purpose of said meeting as ordered by the commissioners had been given. A view of the premises was taken.

By adjournment, further hearings of the said parties were given on Tuesday, January 31st, at eleven o'clock in the forenoon, at the City Hall in the city of Boston, and on Tuesday, February 14th, at the City Hall in the city of Boston. And on Tuesday, August 15th, a further hearing was given at the old Court House in the city of Boston.

Having carefully viewed and considered the said crossing mentioned in the aforesaid petition, and having heard and carefully considered all evidence, plans, and suggestions of the several parties, the said commissioners do find and decide:

That alterations and improvements as described in the following specifications or descriptions, and in accordance with the plans submitted herewith, are necessary to abolish or overcome all grade crossings on that part of Chelsea bridge or Chelsea-bridge avenue, crossing Mystic river in said county, and the commission does prescribe the manner and limits within which said alterations and improvements shall be made, and does determine how the work shall be done as set forth in the said specifications and descriptions and shown on said plans.

And the said commission does decide that said grade crossing shall be abolished or overcome by carrying the highway, by a bridge or superstructure, over the present railroad crossings on the said bridge or avenue, and orders that the present highway, within the limits of the Boston & Maine Railroad property, be discontinued, except so far as the use of the same may be required for the proper and convenient construction, maintenance, alteration, and repair of said overhead structure and the foundation and support thereof, and of any reconstruction of the same.

DESCRIPTION.

The grade of the highway shall be so raised that the said highway shall pass over the tracks of the Boston & Maine Railroad. The limits within which the said alterations and improvements shall be made shall be as follows: Beginning at a point on the easterly side of Chelsea street in the city of Boston, about eighty-five feet southerly from the southerly line of Scott court produced, then northerly along the easterly line of Chelsea street, Chelsea avenue, and Chelsea bridge, a distance of two thousand seven hundred and seventy-seven feet to a point one hundred and eighty-eight feet southerly from the southerly end of the drawbridge at the main channel of Mystic river. The above-described line to be the easterly side line of the street as altered and improved.

The grade of the street as altered and improved shall be as follows: Beginning at the southerly end, at the present grade of Chelsea street, the grade shall rise at a rate not exceeding three feet per one hundred

feet to the southerly end of the southerly drawbridge; thence on a level grade of thirty-six feet above the city base to the northerly end of said drawbridge; thence with a rise not exceeding 1.50 feet per 100 feet to a height of 38 feet above the city base; thence level at said height of 38 feet about 1,100 feet; thence with a fall not exceeding 3 feet per 100 feet to a point about 188 feet from the southerly end of the drawbridge over the main channel of the Mystic river, these grades to be softened at all intersections by vertical curves. The grade line, as described, shall be the grade of the centre of the driveway.

The viaduct, carrying the street over the tracks of the Boston & Maine Railroad, shall be constructed as follows:

Suitable piles shall be driven under each pier in three rows, $2\frac{1}{2}$ feet between centres of rows, with piles $2\frac{1}{2}$ feet apart in the rows, the piles to be cut off at grade 7 above city base. On the piles, a pier of granite or other equally durable stone. The bottom course to be 6 feet wide, the second course 5 feet wide. The piers shall have a coping or bridge seat course 4 feet wide, 54 feet long, and 2 feet thick, except the three northerly piers, which shall be 51 feet long.

The piers under the bridge seat course shall be 3 feet thick and batter $1\frac{1}{2}$ inch per foot to the second foundation course named above. The stone shall be cut, bed and build, with cut vertical joints, the joints not to exceed $\frac{1}{2}$ inch; no stone to have a thickness less than its rise, and at least $\frac{1}{3}$ of the stone above the foundation courses shall be headers extending through the pier; stone shall be laid in cement mortar and grouted with cement. The angle of the piers with the line of the viaduct shall be 72 degrees, right-hand end forward, except the three most northerly piers, which shall be at right angles to the line of the viaduct. The viaduct shall consist of iron or steel plate girders of span shown on plan marked "Sheet 1" accompanying this report. Approximate length on centre line of viaduct spans:

1.	53 feet.	8.	70 feet.	15.	70 feet.
2.	70 "	9.	70 "	16.	70 "
3.	70 "	10.	70 "	17.	70 "
4.	70 "	11.	70 "	18.	70 "
5.	70 "	12.	65 "	19.	40 "
6.	70 "	13.	65 "	20.	40 "
7.	70 "	14.	70 "	21.	40 "

The plate-girders shall rest on the iron or steel posts, the foot or bottom of each post to be bolted to the stone pier, one end of each girder shall be firmly fastened to the post, the other end to have suitable provision for expansion and contraction; floor-beams of iron or steel shall be riveted to the girders; and upon the floor-beams hard-pine stringers shall be placed. The dimensions of the stringers shall be 10×12 inches under each rail of the street-railroad tracks, and 6×12 under the rest of the driveway, spaced 24 inches apart, centre to centre.

All parts of the structure which are of iron or steel shall be so proportioned that the weight of the structure and floor, including paving, in addition to one hundred pounds per square foot on the driveway and sidewalk for live load, shall not strain any part more than 13,000 pounds in tension, or 10,000 pounds in compression per square inch. Such additional strength shall be given to the westerly girder that a sidewalk 8 feet wide can be added on brackets, without straining it beyond the limit noted above.

On the stringers, plank 6 inches thick, of hard-pine or spruce, treated with some approved preservative process, shall be placed. The plank shall be laid close and painted on top with a mixture of paving pitch and crude coal tar, put on hot, and then covered with four thicknesses of roofing felt, in the manner used for the best quality of tar and gravel

roofing; the felt will then be covered with a layer of concrete 2 inches thick, upon the concrete will be laid a bed of fine, sharp sand, clean and dry, 1 to 1½ inches thick. The granite paving-blocks shall be of dimensions 10 to 14 inches long, 4 inches wide, and 6 to 6½ inches deep, to be laid at right angles to the line of the street, each course to be of blocks of a uniform width and thickness, and so laid that all longitudinal joints shall be broken by a lap of at least two inches. After the blocks are laid, the joints are to be filled with clean, fine, hot, dry, washed pebbles, and the blocks carefully rammed to a firm, unyielding bed, with uniform surface and with proper grade.

The joints are to be poured full of paving cement, of approved consistence and composition, at a temperature of 300 degrees Fahrenheit, two or more pourings to be made, if necessary, to fill the joints.

The sidewalk shall be covered with two-inch clear hard-pine plank, planed one side. Guard-timbers and cast-iron curbs of form and dimensions used by the city of Boston shall be placed on both sides of the driveway throughout its entire length, except on the drawbridge, and such portions of the south approach as may be solid fill.

Scuppers or drains shall be provided on each side of the Viaduct, near each pier, to consist of a circular cast-iron pipe, 10 inches in diameter, the top ½ inch below the paved surface, and the bottom reaching 2 inches below the bottom of the floor plank, the opening to be properly protected with a perforated cover. A board fence 5 feet high shall be built on each side of the Viaduct across land of the Boston & Maine Railroad; on remaining parts of the structure a neat fence of wrought-iron or pipe shall be built, the same to be well and firmly fastened to the structure.

The width of the driveway on the Viaduct shall be 45 feet, with a sidewalk 8 feet wide on the easterly side.

Provision shall be made for fastening to the Viaduct, at each pier, poles to carry the wires of the street railroad.

An inclined driveway leading to the driveways or yards of the Boston & Maine Railroad shall be built; that portion of the inclined driveway which is at a less height than grade 21 shall be made solid with retaining walls and earth fill. That portion which is above grade 21 shall be constructed on oak piles with hard-pine girders and stringers.

The entire inclined driveway shall have a paved floor similar to that on Viaduct already described. The width of the inclined driveway shall be 30 feet clear between fences. The grade shall be 3½ feet per hundred, with a level space 55 feet long near the centre, from which two inclined ways shall descend, as shown on plan marked "Sheet 1."

Substantial fences shall be built on each side of the inclined driveway. The curves of the side lines at the upper end of the inclined driveway, where it joins the Viaduct, shall have a radius of not less than 40 feet.

APPROACHES TO THE VIADUCT.

The inclined approaches to the Viaduct shall, at both ends, be built upon the present piles, with hard-pine timbers, as shown on plan marked "Sheet 3" accompanying this report.

The drawbridge now in use at the South Channel shall be raised to conform to the new grade established above by adding to the draw foundations a proper timber structure.

The structure of the approaches above the present piles shall be as follows: The girders now on the piles shall be fastened with additional bolts wherever those now in use show weakness, a rider 6 × 16 inches shall be put on the girders, 5 stringers 12 × 12 inches shall be bolted to the rider, posts 12 × 12 inches shall be put over each pile, girders 6 × 12 at the top of posts, a rider 6 × 16 on top of the girders, bolsters 6 feet long, 12 × 14 on top of rider over each post, stringers 12 × 14 on top of each bolster, proper crown of centre being made by

fitting bolsters. A floor and paving similar to that ordered on the Viaduct shall be made on the stringers. Transverse braces 4×12 inch shall be spiked or bolted to each bent of posts, longitudinal braces 6×12 inch to each alternate row of posts, those next the stringers provided for on the lower stage.

All timbers to be of hard-pine of the quality known as "Prime." All timbers to be bolted and fastened in a thorough manner.

At the southerly end, from the point of beginning to within 18 feet of the sea wall, the inclined approach shall be made solid, with a retaining wall on each side on the street line, and on the northerly end of the fill.

The retaining wall shall be of granite rubble laid in cement and grouted with cement. The wall shall have at every point a thickness of at least one-half the height of the wall above that point, shall have a proportion of at least one-quarter headers 4 feet long, well bonded and joints broken, shall have a coping course not less than 18 inches thick and $2\frac{1}{2}$ feet wide, with a smooth even top.

The space behind the wall shall be filled with gravel or earth well packed, no clay being placed within six feet of the stone work, or within four feet of the street surface.

The surface shall be paved with the same stone now in use, and the sidewalks left in as good condition as at present.

Such provision as may be necessary to provide access to the adjoining property may be made.

Gutters and drains shall be made to ensure free drainage.

Fences shall be built on each side, where needed, to protect public travel.

All iron work provided for, and fences and other timber structures, where exposed to the weather, shall be painted with two coats of linseed oil and lead paint.

A safe and convenient way for public travel shall be provided outside the limits of the present street, across lands of the Boston & Maine Railroad, and the same kept open as long as it can be without interfering with the completion of the alterations hereby ordered.

All permanent alterations and improvements hereby ordered shall be made within the present limits of the street and bridges.

Three sheets of plans accompanying this order are made part of this order.

GEORGE F. TUCKER,
EDWARD D. HAYDEN,
A. H. WRIGHT,
Commissioners.

Fees and charges of three commissioners	\$900 00
Expenses of commissioners	\$121 20
E. K. Turner, engineer	275 00
	<hr/>
	396 20
	<hr/>
Total	\$1,296 20

BOSTON, September 2, 1893.

I hereby certify that the above charges for services and expenses are correct.

GEORGE F. TUCKER.

Copy.

Attest:

JOS. A. WILLARD,
Clerk.

COMMONWEALTH OF MASSACHUSETTS.

SUPERIOR COURT.

SUFFOLK, SS.

OCTOBER 15, 1893.

ALFRED C. CONVERSE, MAYOR OF CHELSEA, ET AL.,

PETITIONERS, ETC. EQUITY, No. 495.

DECREE CONFIRMING DECISION OF COMMISSIONERS.

And now on this sixth day of September, 1893, upon motion of the petitioners that the decision of the commissioners in this matter be confirmed, and notice having been given to the following parties in interest, to wit, the Attorney General, the City of Boston, the Boston & Maine Railroad, and the Lynn & Boston Railroad Company, and it appearing by certificate from the railroad commissioners that in their judgment the expenditure required by such decision on the part of the Commonwealth for the current year will not exceed the limit prescribed by Chapter 428 of the Acts of the year 1890, it is ordered, adjudged, and decreed that such decision of the commissioners be accepted and confirmed.

By the Court,

THEODORE M. OSBORNE,

Assistant Clerk.

Copy.

Attest:

JOS. A. WILLARD,

Clerk.

ABOLITION OF GRADE CROSSINGS.

The abolition of the grade crossing at Dover street by the erection of an overhead bridge was undertaken under the General Statutes for the abolition of grade crossings, which is as follows:

(CHAP. 428 OF THE ACTS OF 1890, AS AMENDED IN 1892 AND 1893.)

AN ACT TO PROMOTE THE ABOLITION OF GRADE CROSSINGS.

Be it enacted, etc., as follows:

SECTION 1. Upon petition of the mayor and aldermen of a city or of the selectmen of a town, in which a public way and a railroad cross each other at grade, or of the directors of the railroad company, setting forth that the petitioners are of the opinion that it is necessary for the security and convenience of the public that an alteration should be made in such crossing, in the approaches thereto, in the location of the railroad or public way, or in the grades thereof, so as to avoid a crossing at grade, or that such crossing should be discontinued with or without building a new way in substitution therefor, — the superior court, or any justice thereof sitting in equity for the county in which such crossing or a portion thereof is situated, after such notice by public advertisement or otherwise as the court shall deem desirable and a hearing, may in its discretion appoint a commission of three disinterested persons.

SECT. 2. A petition under the preceding section may embrace several crossings, or by order of the court several separate petitions may be consolidated and heard as one.

SECT. 3. The members of the said commission shall meet as soon as may be after receiving notice of their appointment; and if, after due notice and hearing, the commission decide that the alterations are necessary for the security and convenience of the public, it shall prescribe the manner and limits within which such alterations shall be made, and shall determine which party shall do the work, or shall apportion the work to be done between the railroad companies and the city or town. The railroad companies shall pay sixty-five per centum of the total actual cost of the alterations, including in such cost the cost of the hearing and the compensation of the commissioners and auditors for their services, and all damages, including those mentioned in section five of this act; and the said commission shall apportion the remaining thirty-five per centum of said cost between the Commonwealth and the city or town in which the crossing or crossings are situated: *provided, however*, that not more than ten per centum of such cost shall be apportioned to such city or town: *provided, further*, that the Commonwealth shall not be charged any part of the expenses of abolishing grade crossings which are established after the passage of this act.

SECT. 4. If the commission decide that any portion of an existing public way should be discontinued it shall so specify, and it shall further specify the grades for the railroad and the public way or ways and the general method of construction, and also what land or other property it deems necessary to be taken: *provided, however*, that if such decision involves a change in the grade of the railroad, the consent of the railroad commissioners to such change of grade shall first be obtained. Said commission shall forthwith return said decision into the said superior court. The decree of the court confirming the decision of the commission shall be final and binding. If the commission decides that the location of the railroad or of the public way shall be changed, the decree of the court confirming such decision shall constitute a taking of the specified land or other property; and it shall be the duty of the clerk of said court, within thirty days after the making of said decree, to cause a copy of such decision and decree to be filed with the county commissioners of the county or counties in which the land or other property taken and the crossing are situated, and also to be recorded in the registry of deeds for the counties and districts in which such land, property, and crossings are situated, and also to be filed with the auditor of the Commonwealth. Said taking shall be deemed to be a taking by the city or town if the land is to be used for a public way, or by the railroad company if the land is to be used by the railroad.

SECT. 5. All damages sustained by any person in his property by the taking of land for, or by the alterations of the grade of, a public way shall primarily be paid by the city or town; and all damages occasioned by the taking of land for the railroad shall primarily be paid by the railroad company; and in case the parties interested cannot agree upon said damages, the city, town, railroad company, or other party may have the damages determined by a jury at the bar of the superior court for the county wherein the property and crossing are situated, on petition, brought within one year after the day of the date of the decree of the court confirming the decision of said commission, by either of said parties, in the same manner and under like rules of law as damages may be determined when occasioned by the taking of land for the locating and laying out of railroads and public ways, respectively, in such city or town.

SECT. 6. After the completion of the work, the crossing and its approaches shall be maintained and kept in repair as follows: when the public way crosses the railroad by an overhead bridge, the frame-

work of the bridge and its abutments shall be maintained and kept in repair by the railroad company, and the surface of the bridge and its approaches shall be maintained and kept in repair by the town or city in which the same are situated. When the public way passes under the railroad, the bridge and its abutments shall be maintained and kept in repair by the railroad company, and the public way and its approaches shall be maintained and kept in repair by the town or city in which they are situated.

SECT. 7. The court shall appoint an auditor, who shall be a disinterested person, not an inhabitant of the city or town in which the crossing is situated, to whom shall from time to time be submitted all accounts of expense, whether incurred by the railroads, city, town, commission, or auditor, who shall audit the same and make report thereon to the court; which auditing, when accepted by the court, shall be final. The compensation of the auditor shall be determined in accordance with the provisions of law relative to the compensation of auditors appointed by the superior court in civil cases. Said court shall, from time to time, issue its decrees for payment on the part of the railroad corporation, not exceeding the amounts apportioned to it by said auditor, and for the payment on the part of the Commonwealth, not exceeding the amounts apportioned to the Commonwealth and to the city or town; and such city or town shall repay to the Commonwealth the amount apportioned to the city or town by said auditor, in such annual payments as the auditor of the Commonwealth may designate; and the amount of the payment designated for the year, with interest thereon at the rate of four per cent per annum from the date of the acceptance of the report of the auditor, in the case of the first payment, and for one year, in the case of each of the other payments, shall be included by the treasurer and receiver general in, and made a part of, the sum charged to such city or town, and be assessed upon it in the apportionment and assessment of its annual state tax; and said treasurer shall in each year notify such city or town of the amount of such assessment, which amount shall be paid by the city or town into the treasury of the Commonwealth at the time required for the payment and as a part of its state tax.

SECT. 8. The superior court or any justice thereof sitting in equity in any county shall have jurisdiction to compel compliance with this act, and with the decrees, agreements, and decisions made thereunder; and may issue and enforce such interlocutory decrees and orders as justice may require; and it shall be the duty of the attorney-general or his assistants to appear and represent the Commonwealth in all suits and proceedings arising under this act. Service of the petition and all notices or processes may be made upon the Commonwealth by leaving an attested copy in the hands or in the office of the attorney-general.

SECT. 9. If the board of aldermen of a city or the selectmen of a town in which a public way and a railroad cross each other, and the board of directors of the railroad company, are of opinion that it is necessary for the security and convenience of the public that alterations should be made in such crossing, in the approaches thereto, in the location of a railroad or public way, or in the grades thereof, or in a bridge at such crossing, or that such crossing should be discontinued with or without building a new way in substitution therefor, and if they agree as to the alterations which should be made, an instrument in writing signed in behalf of a city by the mayor, on being thereto duly authorized by the board of aldermen, or in behalf of a town by the chairman of the selectmen, on being thereto duly authorized by the board of selectmen, and by the president of the railroad company, on being thereto duly authorized by its board of directors, specifying the manner and limits within which the alterations shall be made, and by which party the work shall be done, or how it shall be apportioned between the city or town and the railroad company, the general method of construction,

the grades for the railroad and the public way or ways, and also what land or other property it is necessary to take, and what portion, if any, of an existing public way is to be discontinued, and how the cost thereof shall be apportioned between the city or town and the railroad company, shall be valid and binding on the city or town and the railroad company, respectively, and have the same force and effect as a decree of the court under the provisions of this act: *provided*, that the board of railroad commissioners, after notice to all parties interested by advertisement and a public hearing, approve of the alterations set forth in the agreement as necessary for the convenience and security of the public. Said approval by the board shall constitute a taking of the land and other property specified in the agreement as necessary to be taken, and it shall be the duty of the clerk of said board, within thirty days after such approval, to cause a copy of the agreement and approval to be filed with the county commissioners of the county or counties in which the land or other property taken and the crossing are situated, and also to be recorded in the registry of deeds for the counties and districts in which such land, property, and crossing are situated, and also to be filed with the auditor of the Commonwealth. The provisions contained in this act relating to the taking of land under a decree of the court and in relation to the recovery of damages sustained by any person in consequence of such taking, or of the alterations made in pursuance of said decree, shall apply to the taking of land and damages sustained under an agreement between the city or town and the railroad company made as herein provided; except that the petition for the determination of damages may be brought within one year after the date of the approval of such agreement by the board of railroad commissioners. After the completion of the work the crossing and approaches shall be maintained and kept in repair as provided in section six of this act. If the agreement provides for the abolition of a public grade crossing it shall be the duty of the board of railroad commissioners to keep itself informed of the progress and character of the work and the amounts reasonably expended for work done or for damages, so far as rendered necessary for the abolition of the grade crossing; and for that purpose it may employ any necessary agents, and from time to time as it may deem proper shall issue certified statements of the amount legally and properly expended for such abolition of a grade crossing; and the Commonwealth shall pay to the parties entitled thereto under the agreement twenty per centum of such expenditure.

SECT. 10. The amount to be paid under the provisions of this act by the Commonwealth in any one year (the year beginning with the passage of this act) shall not exceed five hundred thousand dollars, and the total amount to be paid by the Commonwealth under the provisions of this act shall not exceed five million dollars; and the treasurer and receiver-general of the Commonwealth shall pay the amount of cost allotted to the State from any money not otherwise appropriated, and is hereby authorized, when requested by the governor and council so to do, to issue and sell bonds from time to time, under such terms and conditions, and with a sinking-fund for their redemption, as shall best promote the welfare of the Commonwealth.

SECT. 11. Notice shall be filed by the petitioners with the railroad commissioners of the entry of any petition under the provisions of this act; and in case application shall be made for changes in grade crossings, which will require, in the opinion of said commissioners after an examination of the decision of the commission appointed by the court, a larger expenditure in any one year on the part of the Commonwealth than the amount provided for by this act, said railroad commissioners shall have full power to decide which, if any, of said pending petitions shall be proceeded with during the year; and no decree shall be entered under any such petition until a certificate is filed thereon by the railroad

commissioners, that, in their judgment, the expenditure on the part of the Commonwealth will not exceed the amount provided for by this act.

SECT. 12. The provisions of sections one hundred and twenty-nine to one hundred and thirty-six, inclusive, of chapter one hundred and twelve of the Public Statutes, chapter one hundred and thirty-five of the acts of the year eighteen hundred and eighty-two, chapter one hundred and ninety-four of the acts of the year eighteen hundred and eighty-five, and chapter two hundred and ninety-five of the acts of the year eighteen hundred and eighty-seven, so far as they relate to proceedings for the abolition of grade crossings, shall not apply to the provisions of this act: *provided, however*, that nothing in this act shall have effect upon cases pending or upon any right accrued at the time of its passage.

SECT. 13. This act shall take effect upon its passage.

[*Approved June 21, 1890.*]

This act was amended in Section 4 by the Act of May 19, 1892 (Chapter 312), and by the Act of May 3, 1893 (Chapter 283).

The wording of the act is given as amended.

WEST FOURTH-STREET CROSSING.

The Directors of the Old Colony Railroad Company petitioned the Superior Court for the alteration of the grade crossing of the railroad and West Fourth street. A hearing was given in November, 1892, at the office of the Railroad Commissioners, at which Mr. J. H. Benton, Jr., appeared for the Railroad Company, and the City Solicitor for the city of Boston.

It was decided that it was necessary for the convenience and security of the public that an alteration should be made in the crossing, and in the approaches thereto, by which "the crossing at grade" should be abolished.

The limits of the alterations were determined upon as follows:

From the westerly line of Dorchester avenue at West Fourth at a point ten feet south of the southerly line, to include the area of West Fourth street and areas of private land taken to Foundry street, crossing Foundry street to intersection of Fourth and Dover streets; to include Dover street from Foundry to Albany, Albany street to a point 320 feet south of southerly line of Dover, Bristol street 100 feet west of Albany, Dover street 188.6 feet west of Albany, and Albany street 345 feet north of Dover to Troy street.

GRADES.

The grade beginning at Dorchester avenue and West Fourth at grade 17.50 rises 3.5 feet per hundred for about 471 feet, thence by an ascending grade of 0.32 feet per hundred for 400 feet; thence level 245 feet at grade

35.27; thence descending 3.5 feet per hundred for about 344 feet; thence level across Albany street at grade 23.23; thence descending 3.5 feet per hundred 188.6 feet to grade 16.63 at Dover street (present grade).

Albany street was to rise from Troy 2.18 feet per hundred to Dover; thence level at grade 23.23 across Dover; thence descending 2.0 feet per hundred for 320 feet to the present grade of Albany.

Bristol street was to begin at grade 18.93 at the westerly line of Albany; thence descending by 2.0 feet per hundred for 100 feet to meet the present grade.

All intersections of grade lines were to be softened by easy transition curves from one grade to another. Certain parcels of land were necessarily taken, one belonging to Charles U. Cotting and Francis Weld, trustees under the will of Samuel K. Williams; one belonging to Hervey C. Corey, two parcels, to trustees of Cyrus Alger estate; one to the Old Colony Railroad company; one to Mary C. Devine; and one to William H. Devine.

The portion of streets lying between Dorchester avenue and Foundry street were to be supported by rubble masonry retaining walls where necessary, with dimension stone cap at the level of sidewalk.

The portion from the easterly line of Foundry street extending about 480 feet over Old Colony Railroad to the dock of the Fort Point channel was to be constructed with an iron truss bridge with plank roadway and sidewalks, the bridge to be supported upon stone piers upon pile foundation, with stone abutments at Foundry street. The portion over Fort Point channel was to be supported upon an iron bridge with paved roadway, supported upon iron columns or stone piers and provided with draw span, the westerly end of the bridge to be supported by a stone abutment. From this point westerly, the roadway was to be supported by rubble masonry retaining walls where necessary, with dimension stone cap.

The railroad company was to do all the work except the building of bridge across Fort Point channel, which was assigned to the city of Boston.

Sixty-five per cent. of the cost was to be borne by the Old Colony Railroad Company, twenty-five per cent. by the Commonwealth, and ten per cent. by the city of Boston.

DOVER-STREET BRIDGE.

The old Dover-street bridge, now removed on account of the abolishing of the grade-crossing at West Fourth street,

was of wood on a pile foundation with a double iron draw, operated by horse power; it was originally built in 1805, was rebuilt in 1858-1859, and later in 1876.

On July 26, 1893, the Board of Harbor and Land Commissioners granted to the city of Boston a license to rebuild a portion of Dover-street bridge in and over the tidewaters of the Fort Point channel, as directed by a special commission appointed under the provisions of the grade-crossing act. The Board in granting this license imposed the condition that the draw-way in said bridge should be built with an opening of not less than forty feet at all stages of the tide for the passage of vessels; but it was further provided that until the draw-way in the bridge of the Old Colony Railroad Company over Fort Point channel shall be rebuilt and widened, the city may maintain its water-pipes temporarily in their present position on the Dover-street bridge and draw-way, with such structures as are necessary for their support and protection, leaving a clear opening of 36 feet in the draw-way, such water-pipes and temporary structures to be removed or changed by the city so as to leave a clear opening of 40 feet in the draw-way whenever such removal or change shall be ordered by the Board after hearing. The Old Colony Railroad bridge is below the Dover-street bridge, so that the additional width in the passageway in the Dover-street bridge draw will be useless until the draw-way in the bridge of the Old Colony Railroad Company is correspondingly widened.

In September, 1893, Dover street was closed to public travel, and work was commenced on the new structure. For the convenience of foot-passengers a temporary draw was erected, and passageways for foot travel constructed on either side. These are maintained by this division. The work on the South Boston end of the new structure is progressing rapidly.

The full text of the decree of the court was as follows :

COMMONWEALTH OF MASSACHUSETTS.

SUPERIOR COURT.

SUFFOLK, SS.

DIRECTORS OF THE OLD COLONY RAILROAD COMPANY, PETITIONERS FOR
ALTERATION OF THE GRADE CROSSING OF THE RAILROAD OF SAID
COMPANY, AND WEST FOURTH STREET, IN THE CITY OF BOSTON.

DECISION OF COMMISSION.

The commissioners, heretofore appointed in said matter, decide and report as follows :



DOVER-STREET BRIDGE OVER FORT POINT CHANNEL.

(To abolish grade crossing on O.C. R.R.)

First. We gave notice of a hearing upon said petition on the fourteenth day of November, 1892, at the office of the Railroad Commissioners in the city of Boston, by publishing a copy of said petition and an order of notice of said time and place of hearing in the "Boston Journal" and the "Boston Herald," newspapers published in the city of Boston, and by serving an attested copy of said petition and notice upon the Secretary of the Commonwealth and the Attorney-General, and the Treasurer and Clerk of the city of Boston, more than thirty days before said time of hearing, as appears by the return of service upon said petition and order of notice herewith returned.

Second. At the time and place notified, as above set forth, a hearing was held by the commissioners, at which J. H. Benton, Jr., appeared for the petitioners, the City Solicitor appeared for the city of Boston.

And now, having duly considered the evidence and arguments submitted to us in this matter, we decide and report as follows:

First. We decide and report that it is necessary for the convenience and security of the public that an alteration should be made in the crossing of West Fourth street and of the railroad of the Old Colony Railroad Company in the city of Boston, in the approaches thereto, and in the grades of said West Fourth street and Dover street, so as to avoid such crossing at grade as alleged in the petition.

Second. We prescribe the manner and limits within which such alterations shall be made, as follows:

The grade of West Fourth street, Dover street, and Albany and Bristol streets shall be altered and established within the following limits, as follows:

Limits: Beginning at a point in the intersection of the westerly side line of Dorchester avenue and a line drawn ten (10) feet southerly from and parallel to the southerly side line of West Fourth street; thence running westerly ten (10) feet from and parallel to the southerly side line of West Fourth street about three hundred and ninety-eight (398) feet to the easterly side line of Foundry street; thence in the same straight line across Foundry street fifty (50) feet to the intersection of the westerly side line of Foundry street with the southerly side line of West Fourth street; thence westerly by said southerly side line of West Fourth street and Dover street, crossing the Old Colony Railroad and Fort Point channel about fourteen hundred and sixty (1,460) feet to the easterly side line of Albany street; thence southerly in said easterly side line of Albany street about three hundred and twenty (320) feet to a point; thence westerly at right angles to the last described line eighty (80) feet to the westerly side line of Albany street; thence northerly in said westerly side line of Albany street about eighty-five (85) feet to its intersection with the southerly side line of Bristol street; thence westerly in said southerly side line of Bristol street about one hundred (100) feet to a point; thence northerly at right angles to said last described line forty (40) feet to the northerly side line of Bristol street; thence easterly in said northerly side line of Bristol street about one hundred (100) feet to its intersection with the westerly side line of Albany street; thence northerly in said westerly side line of Albany street about one hundred and ninety-five (195) feet to the southerly side line of Dover street; thence westerly in said southerly side line of Dover street one hundred and eighty-eight and six-tenths (188.6) feet; thence northerly at right angles to the last described line sixty (60) feet to the northerly side line of Dover street; thence easterly in said northerly side line one hundred and eighty-eight and six-tenths (188.6) feet to the westerly side line of Albany street; thence northerly in said westerly side line of Albany street about three hundred and forty-five (345) feet to its intersection with the southerly side line of Troy street; thence easterly at right angles to said westerly side line of Albany street eighty (80) feet to the easterly side line of Albany street; thence

southerly in said easterly side line of Albany street about three hundred and forty-five (345) feet to the northerly side line of Dover street; thence easterly in said northerly side line of Dover street across the Fort Point channel and the Old Colony Railroad about fourteen hundred and sixty (1,460) feet to the westerly side line of Foundry street; thence in the same straight line across Foundry street fifty (50) feet to the intersection of the easterly side line of Foundry street with the northerly side line of West Fourth street; thence easterly in said northerly side line of West Fourth street about three hundred and eighty-eight (388) feet to the westerly side line of Dorchester avenue; thence southerly in said westerly side line of Dorchester avenue about sixty-three (63) feet to the point of beginning.

The grades of the surfaces of West Fourth street, Dover street, Albany street, and Bristol street, as altered, are established upon the city of Boston base or datum plane, and upon their centre lines are as follows:

The alteration of grade of West Fourth street and Dover street begins in the centre line of West Fourth street at its intersection with the westerly side line of Dorchester avenue at elevation 17.50, thence by an ascending grade of three and five-tenths (3.5) feet per hundred (100) feet, about four hundred and seventy-one (471) feet to elevation 34.00; thence by an ascending grade of thirty-two one-hundredths (0.32) feet per hundred (100) feet four hundred (400) feet to elevation 35.27; thence level two hundred and forty-five (245) feet to elevation 35.27; thence by a descending grade of three and five-tenths (3.5) feet per hundred (100) feet, about three hundred and forty-four (344) feet to the easterly side line of Albany street at elevation 23.23; thence level eighty (80) feet to the westerly side line of Albany street at elevation 23.23; thence by a descending grade of three and five-tenths (3.5) feet per one hundred (100) feet one hundred and eighty-eight and six-tenths (188.6) feet to elevation 16.63 at the present grade of Dover street.

The alteration of grade of Albany street begins in the centre line of Albany street at its intersection with the southerly side line of Troy street produced at elevation 15.70; thence by an ascending grade of two and eighteen one-hundredths (2.18) feet per one hundred (100) feet about three hundred and forty-five (345) feet to the northerly side line of Dover street at elevation 23.23; thence level sixty (60) feet to the southerly side line of Dover street at elevation 23.23; thence by a descending grade of two (2) feet per hundred (100) feet about three hundred and twenty (320) feet to elevation 16.83 at the present grade of Albany street.

The alteration of grade of Bristol street begins in the centre line of Bristol street at its intersection with the westerly side line of Albany street at elevation 18.93; thence by a descending grade of two (2) feet per hundred (100) feet about one hundred (100) feet until it meets the present grade of Bristol street.

All the grade lines as described shall have their intersection so altered by a curved line as to form an easy transition curve from one grade to the other. The length of these curves shall not exceed one hundred (100) feet.

Said alteration of the grades of Albany street and Bristol street is incidental to and necessarily required by the alterations hereinabove provided for and in the grades of West Fourth street and Dover street.

To make the alterations hereinabove provided for, it is necessary to take for highway purposes the following-described parcels of land which are hereby taken for highway purposes:

A parcel of land supposed to belong to Charles U. Cotting and Francis Weld, trustees under the will of Samuel K. Williams, being a strip of land ten (10) feet wide, bounded easterly by the westerly side line of Dorchester avenue about eleven (11) feet; northerly by the southerly

side line of West Fourth street about ninety-nine (99) feet; westerly by land supposed to belong to Hervey C. Corey ten (10) feet; southerly by remaining land of said Cotting and Weld, trustees, about one hundred and three (103) feet, and containing ten hundred and ten (1,010) square feet, more or less.

Also, a parcel of land supposed to belong to Hervey C. Corey, being a strip of land ten (10) feet wide, bounded easterly by land supposed to belong to said Cotting and Weld, trustees, ten (10) feet; northerly by the southerly side line of West Fourth street, about thirty-one (31) feet; westerly by land supposed to belong to trustees of Cyrus Alger estate ten (10) feet; southerly by remaining land of said Hervey C. Corey, thirty-one (31) feet, and containing three hundred and ten (310) square feet, more or less.

Also, a parcel of land supposed to belong to the trustees of Cyrus Alger estate, being a strip of land ten (10) feet wide, bounded easterly by land supposed to belong to said Corey, ten (10) feet; northerly by the southerly side line of West Fourth street, about sixty-three feet; easterly by land of Old Colony Railroad Company, about ten (10) feet; southerly by remaining land of said trustees of Cyrus Alger estate, about sixty-one (61) feet, and containing six hundred and twenty (620) square feet, more or less.

Also, a parcel of land belonging to the Old Colony Railroad Company, being a strip of land ten (10) feet wide, bounded easterly by land supposed to belong to said trustees of Cyrus Alger estate, about ten (10) feet; northerly by the southerly side line of West Fourth street, about twenty-five (25) feet; easterly by other land supposed to belong to said trustees, about ten (10) feet; southerly by remaining land of said Old Colony Railroad Company, about twenty-five (25) feet, and containing two hundred and fifty (250) square feet, more or less.

Also, a parcel of land supposed to belong to trustees of Cyrus Alger estate, being a strip of land ten (10) feet wide, bounded easterly by land of said Old Colony Railroad Company, about ten (10) feet; northerly by the southerly side line of West Fourth street, about ninety-seven (97) feet; westerly by land supposed to belong to Mary C. Devine, ten (10) feet; southerly, by remaining land of said trustees, about ninety-nine (99) feet, and containing nine hundred and eighty (980) square feet, more or less.

Also, a parcel of land supposed to belong to Mary C. Devine, being a strip of land ten feet wide, bounded easterly by land supposed to belong to trustees of Cyrus Alger estate, ten (10) feet; northerly, by the southerly side line of West Fourth street, thirty-eight (38) feet; westerly by land supposed to belong to William H. Devine, ten (10) feet; southerly by remaining land of said Mary C. Devine, thirty-eight (38) feet, and containing three hundred and eighty (380) square feet, more or less.

Also, a parcel of land supposed to belong to William H. Devine, being a strip of land ten (10) feet wide, bounded easterly by land supposed to belong to said Mary C. Devine, ten (10) feet; northerly by the southerly side line of West Fourth street, about forty-one (41) feet; westerly by the easterly side line of Foundry street, ten (10) feet; southerly by remaining land of said William H. Devine, about forty-one (41) feet, containing four hundred and ten (410) feet, more or less.

Dover street, West Fourth street, Albany street, and Bristol street, as thus altered in the location and grade thereof, shall be constructed of the full width of the limits shown upon the plan herewith filed, entitled "Plan of Proposed Alteration of the Crossing of the Old Colony Railroad and West Fourth street in the City of Boston," and verified by the signatures of the commissioners, and to the full width of said streets, as widened by the taking of land hereinabove provided for.

Said streets shall also have a sidewalk ten (10) feet wide on each side thereof, forming a part of said streets.

The portion of said streets, from the westerly side of Dorchester avenue to the easterly side line of Foundry street, shall be supported by rubble masonry retaining walls, where necessary, upon the side lines thereof, with a dimension-stone cap at the level of the sidewalk and forming part thereof, and earth filling; and it shall have a paved roadway and curbing and brick sidewalks.

The portion of said streets, from the easterly side line of Foundry street, extending about four hundred and eighty (480) feet over the Old Colony Railroad to the dock of Fort Point channel, shall be constructed with an iron truss bridge with plank roadway and sidewalks, as shown on the plan thereof, made by the Boston Bridge Works, and verified by the signatures of the commissioners, and hereto annexed and made part of this report. Said bridge shall be supported upon stone piers upon a pile foundation and with a stone abutment in the easterly side line of Foundry street, as shown on said plan last mentioned.

The portion of said way extending about four hundred and ten (410) feet over Fort Point channel shall be supported upon an iron bridge that shall have a paved roadway and be supported upon iron columns or stone piers, and shall have a draw span of such width, design, and construction as shall be approved by the Harbor and Land Commissioners.

The westerly end of said bridge shall be supported by a stone abutment upon pile foundations at or near the westerly dock line of Fort Point channel. The portion of said streets lying westerly of said last-named abutment and at the westerly dock line of Fort Point channel shall be supported by rubble-masonry retaining walls, where necessary, upon the side lines thereof, with a dimension-stone cap at the level of the sidewalk and forming a part thereof, and earth filling. It shall have a paved roadway and curbing, and brick sidewalks of the width hereinabove described.

Said streets and bridge within the limits described shall be suitably fenced upon both sides.

Third. The Old Colony Railroad Company shall do all the work herein provided for, except that the city of Boston shall build the bridge over Fort Point channel and the draw therein and its appurtenances.

Fourth. The work herein ordered is to be done and the land to be taken in accordance with the plans filed with this our decision, and hereinbefore referred to as verified by our signatures.

Fifth. We decide that the expense of the alterations hereinabove provided for, including the cost of the hearing and the compensation of the Commissioners and Auditors, and all damages shall be borne and paid as follows, to wit:

Sixty-five (65) per cent. thereof by the Old Colony Railroad Company, as required by law; twenty-five (25) per cent. thereof by the Commonwealth, and (10) per cent. thereof by the city of Boston.

(Signed)

CHAS. S. LILLEY,
FRED'K H. GILLETT,
CHAS. MILLS,
Commissioners.

The city of Boston does not desire to be heard on the question of confirmation of this report by the court, but agrees thereto.

By its Attorney,

A. J. BAILEY,
City Solicitor.

For the Commonwealth.

A. E. PILLSBURY,
Attorney-General.

By C. N. HARRIS,
2d Assistant Attorney-General for the Commonwealth.

COMMONWEALTH OF MASSACHUSETTS.

IN BOARD OF RAILROAD COMMISSIONERS, November 17, 1892.

On the application of the Old Colony Railroad Company :

Ordered, That the Board hereby consents to the construction of a bridge over the Old Colony Railroad at West Fourth street in Boston, at a height provided for in the report of a special commission on the alteration of the crossing of said Old Colony Railroad and West Fourth street.

Attest :

WM. A. CRAFTS,
Clerk.

A true copy.

Attest :

WM. A. CRAFTS.

COMMONWEALTH OF MASSACHUSETTS.

IN BOARD OF RAILROAD COMMISSIONERS, November 17, 1892.

In the matter of the alteration of the grade crossing of the Old Colony Railroad and West Fourth street in the city of Boston, an estimate of the total cost of which alteration has been submitted to the Board.

The Board of Railroad Commissioners hereby certifies that in its judgment the expenditure on the part of the Commonwealth for the current year under this and previous certificates issued under the provisions of Section 11 of Chapter 428, Acts of 1890, will not exceed the limit prescribed by said Act.

Attest :

(Signed)

WM. A. CRAFTS,
Clerk.

A true copy.

Attest :

WM. A. CRAFTS,
*Clerk.*WEST CHESTER-PARK BRIDGE, OVER BOSTON & ALBANY
RAILROAD.

This bridge has been thoroughly repaired and new asphalt sidewalks have been laid. The granite abutments have been raised so that the uneven grade that formerly existed in the street has been greatly relieved. The carpenter and wood work was performed by employees of the bridge division, and all work was done under direction and supervision of the City Engineer.

The bridge was stripped of its woodwork and the iron-work was cleaned and painted. Such old hard-pine stringers as were sound were replaced, and the surface of the bridge was moulded to the required form by additional woodwork, and replanked.

The sidewalks were rebuilt of the full width of the sidewalks on the street, or 15 feet in width in place of 12 feet.

The stone parapet was taken up and reset in cement mortar to the new grade, and the new stone required by the change in sidewalk furnished. The sidewalks were laid with coal-tar concrete.

The street railroad was relaid mostly with new material to

the new grade, and the street was regraded and macadamized, the edgestones reset, and the brick sidewalks relaid from Newbury street to Boylston street and beyond.

The grades adopted were such as to cause no damage to adjoining real estate. The bridge was in such condition as to require stripping and painting, and the special work of the railroad at the corner of Boylston street was torn out; this intersection was in bad condition from settlement, and was about one foot below the established grade.

The cost of the work on the bridge and parapet was \$5,118.71, and the cost of resurfacing West Chester park and the adjoining streets was \$4,081.95.

BROADWAY BRIDGE.

Extensive work has been done on this bridge. The Lehigh-street and Foundry-street spans have been strengthened by hard-pine cross-beams and upright hard-pine supports; the other spans have been in like manner reinforced with hard-pine beams hung under the iron girders; the spans nearest to the draw on both sides have been strengthened by heavy trusses from above.

This work was done by contract and is finished. The process of strengthening caused the demolition of the division stables, which were under the bridge, at Foundry street, and no provision has as yet been made for rebuilding. This matter should receive attention at the hands of the city government, as the division is greatly inconvenienced by the loss of this stable.

L-STREET BRIDGE.

It is to be hoped that early the coming summer this bridge will be opened to foot travel. Owing to the fact that Congress street from C street to L street has not yet been laid out as a public street, it will be impossible for this bridge to be used for team travel during the coming year.

Late in the fall preparations were made and work was begun on a plank sidewalk on the Boston side of the bridge, but the severity of the weather interfered with its continuance during the winter months. Work will be commenced at the earliest moment and pushed until completed.

CHARLES-RIVER BRIDGE.

The original bridge was built in 1785-86; the present structure was built in 1854-55; the draw was built in 1870.

The condition of this bridge has been growing worse from

year to year, and the very frequent closings to public travel, which have occasioned much inconvenience, have prompted the city government of 1894 to pass the following order :

Ordered, That the City Treasurer be hereby directed to issue, at his discretion, and sell either coupon bonds or registered certificates of indebtedness of the city of Boston for the aggregate sum of seven hundred and fifty thousand dollars ; said bonds or registered certificates of indebtedness to be made payable at the office of the said City Treasurer twenty years from the date of the same, with interest thereon at the rate of four per centum per annum, payable semi-annually ; and the money received from the sale thereof is hereby appropriated for a bridge between the city proper and Charlestown.

Ordered, That any premium obtained by the said City Treasurer in the negotiation or sale of said bonds or certificates of indebtedness shall be paid to the Board of Commissioners of Sinking-Funds for the redemption of the debt hereby created.

Approved February 12, 1894.

New asphalt sidewalks have been laid on Berkeley-street bridge over the N.Y., N.H., & H. R.R. and on West Chester-park bridge over the B. & A. R.R.

The abutment walls of the following bridges have been pointed with Portland cement mortar :

Berkeley street (B. & A. R.R.).

Ferdinand street (B. & A. R.R.).

Berkeley street (N.Y., N.H., & H. R.R.).

Huntington avenue (B. & A. R.R.).

The report of the Deputy Superintendent (Appendix A) gives a detailed statement of expenditures on the various bridges, and contains much useful information concerning the nature of repairs and other matters.

BOSTON AND CAMBRIDGE BRIDGES.

By the provisions of the Acts of Legislature of 1870 and 1882, the care of the bridges uniting the city of Boston with the city of Cambridge is placed in the hands of two commissioners, one of whom is appointed by the city of Cambridge, the other by the city of Boston.

The Boston commissioner, according to the Revised Ordinances, is the Superintendent of Streets, and the present commissioner for Cambridge is Mr. William J. Marvin. The bridges thus provided for are four in number, namely :

Canal or Craigie's bridge.
Harvard bridge.
Prison Point bridge.
West Boston bridge.

The following report will show, briefly, the general condition of the various bridges, the repairs made, the work needed to be done, together with a detailed statement of expenditures :

CANAL OR CRAIGIE'S BRIDGE.

The up-stream fender on the Cambridge side has been rebuilt in a substantial manner, the sides of the water-way through the draw have been replanked, and the Samson posts of the draw have been securely fastened in place. A new boiler has been provided for the engine used for turning the draw. The ordinary repairs have been made.

The West End Railway Company has improved its apparatus for crossing the draw, and the cars now run smoothly and without delays. The drawtenders have kept the sidewalks clean, have painted the engine-house on the inside, and made ordinary repairs on the bridge and engine.

The roadway is cleaned once a week, after midnight.

The draw is old and weak, and requires careful attention to keep it in safe condition.

The replanking of the water-way should be completed and the fences painted at once.

HARVARD BRIDGE.

The fences, the plank outside the fences, and the watch-houses at the ends of the bridge have been painted.

The switch of the electrical motor used for moving the draw has been placed in a more convenient position, and the apparatus for moving the draw rearranged. The switch is now in a better position for use, and can be more easily kept in condition and repairs can be more readily made than before. This work was done by the drawtenders.

The position of the draw has been marked for navigation at night by showing red and green electric lights. The red light is shown on the up-stream side of the draw at the Boston end, and the green light on the down-stream side of the draw at the Cambridge end.

The house on the draw pier should be painted and the entire surface plank of the bridge renewed.

The roadway is cleaned once a week, and the surface plank patched when necessary. The drawtenders keep the roadway in order, the sidewalks free from snow, clean the elec-

tric light globes (72 in number) and help to clean the roadway.

PRISON-POINT BRIDGE.

The ell of the drawtender's house has been repaired, the roof tinned and painted and the house renovated inside. The work was done by the drawtender.

Ordinary repairs, such as planking draw, etc., have been made.

This draw is old and hard to raise. It should be replaced by a new draw before many years.

WEST BOSTON BRIDGE.

All the ironwork under the draw has been painted, an addition made to the engine-house for a workshop, coal, ash, and store house. The engine-house has been painted inside. The usual repairs, such as paving, carpentering, etc., have been attended to.

Cleaning on this bridge is done once a week, always after midnight, so as not to interfere with travel. The addition to engine-house, painting outside and inside, also repairs on draw, and cleaning sidewalks, has been done by the drawtenders.

The sides of the water-way on the draw-pier will have to be replanked.

The trusses for carrying the trolley-wires which were placed on the draw in 1892 weighed about one ton each, and were very unsightly. The West End Railroad Company's attention was called to them, and this year they have replaced them by others weighing about six hundred pounds each, thereby relieving the draw of a large and unnecessary weight.

The filled part at the Cambridge end of the bridge has been watered at a small expense, the abutters paying part of the cost.

IN GENERAL.

The usual statement is appended of the number of draw openings and the number of vessels which passed through.

The amount of revenue received for dockage, rents, repairs to West End Street Railway tracks, etc., during the year has been \$1,505.36; one-half, \$752.68, has been paid to the city of Cambridge.

The following is a statement of the payment made by the city of Boston on account of Canal, Harvard, Prison Point, and West Boston bridges, from February 1, 1893, to January 31, 1894:

Amount of appropriation for financial year,

1893-94 \$13,000 00

Amount expended to January 31, 1894 . . . 11,493 16

Unexpended balance ¹\$1,506 84

Classification of Expenses.

1893.	General Account.	Canal Bridge.	Harvard Bridge.	Prison Point Bridge.	West Boston Bridge.	Total.
Salaries	\$250 00	. . . . .	. . . . .	. . . . .	. . . . .	\$250 00
Travelling expenses	56 55	. . . . .	. . . . .	. . . . .	. . . . .	56 55
Printing and stationery	31 77	. . . . .	. . . . .	. . . . .	. . . . .	31 77
Advertising, messengers, etc.	10 12	. . . . .	. . . . .	. . . . .	. . . . .	10 12
Draw-tenders and assistants . . . . .	. . . . .	\$1,140 00	\$1,271 00	\$274 12	\$1,250 00	3,935 12
Electric lights . . . . .	. . . . .	281 68	1,104 09	. . . . .	480 00	1,865 77
General repairs . . . . .	. . . . .	1,417 68	64 63	147 37	218 21	1,847 89
Lumber . . . . .	. . . . .	371 26	8 42	63 55	228 75	671 98
Ironwork . . . . .	. . . . .	289 77	67 35	54 78	237 53	649 43
Cleaning bridges . . . . .	. . . . .	242 10	73 25	. . . . .	295 25	610 60
Inspection . . . . .	. . . . .	190 00	112 50	37 50	147 50	487 50
Electric current and motor repairs . . . . .	. . . . .	. . . . .	301 69	. . . . .	. . . . .	301 69
Fuel . . . . .	. . . . .	131 03	13 63	. . . . .	114 55	259 21
Paint and painting, . . . . .	. . . . .	21 47	111 90	. . . . .	48 04	181 41
Sundries . . . . .	. . . . .	51 13	49 87	10 55	28 95	140 50
Tools and hardware, . . . . .	. . . . .	10 34	23 71	11 87	41 49	87 41
Paving . . . . .	. . . . .	11 25	. . . . .	. . . . .	62 46	73 71
Water-rates . . . . .	. . . . .	16 00	. . . . .	5 50	11 00	32 50
Totals	\$348 44	\$4,173 71	\$3,202 04	\$605 24	\$3,163 73	\$11,493 16

¹ The above balance was transferred to the Board of Aldermen.

Number of Times the Draws in Canal, Harvard, Prison Point, and West Boston Bridges have been opened, and the number of Vessels which have passed through, for the year ending Jan. 31, 1894.

DATE.	Canal.		Harvard.		Prison Point.		West Boston.	
	Number of Draw Openings.	Number of Vessels passed through.	Number of Draw Openings.	Number of Vessels passed through.	Number of Draw Openings.	Number of Vessels passed through.	Number of Draw Openings.	Number of Vessels passed through.
February 1, 1893, to January 31, 1894.								
February, 1893	9	10	0	0	23	48	0	0
March	75	95	20	33	30	42	26	40
April	257	293	169	202	47	62	105	159
May	437	497	248	316	49	91	217	308
June	470	510	297	361	49	66	249	356
July	449	497	210	271	48	67	270	376
August	351	385	222	276	0	0	173	243
September	316	336	198	270	10	12	179	277
October	307	333	158	268	73	113	193	313
November	299	338	131	203	54	75	154	277
December	189	229	73	108	42	73	102	186
January, 1894	73	95	10	13	19	26	41	63
Totals	3,232	3,618	1,736	2,321	444	675	1,709	2,598

Statement showing Traffic over Bridges.

DATE. 1893.	Bridge.	Foot Passengers.	Teams.	Cars.	Car Passengers.
September 8, 6 A.M. to 7 P.M.	Canal	6,704	5,517	496	11,928
	Harvard	2,515	2,690	270	10,612
	Prison Point	2,883	2,121	.....	.....
	West Boston	5,428	3,015	923	20,743
	Total	17,530	13,343	1,689	43,283

PAVING DIVISION.

The following table shows the length of public highways and the character of pavements, February 1, 1894 :

, Length in Miles.

	Sheet Asphalt.	Asphalt Blocks.	Block.	Brick.	Cobble.	Telford and Macadam.	Gravel.	Not graded.	Total.
In previous Report.	5.31	0.69	74.78	0.36	4.59	208.74	137.21	11.66	443.34
February 1, 1894.									
City Proper	4.73	0.81	*41.89	0.36	3.15	29.24	0.55	0.09	80.82
Charlestown	0.03	...	8.45	...	0.14	13.86	0.09	...	22.57
East Boston . . . . .	...	...	4.38	...	0.17	1.92	20.31	0.20	26.98
South Boston	0.53	...	11.58	...	0.05	22.43	1.88	4.03	40.50
Roxbury	0.37	...	7.82	...	0.01	53.49	15.95	1.48	79.12
W. Roxbury . . . . .	...	...	0.09	...	...	28.25	45.09	2.26	75.69
Dorchester . . . . .	...	...	3.47	...	...	45.33	33.73	1.80	84.38
Brighton . . . . .	...	...	...	...	...	17.16	18.40	2.03	37.59
Total	5.66	0.81	77.68	0.36	3.52	211.73	136.00	11.89	447.65

NOTE. — The above districts refer to areas enclosed by the original boundary lines.

* Of this amount 2.13 miles = granite-block paving on concrete with pitched joints.

Total length of public streets, 447.65 miles.

There have been laid out and accepted by the Street Commissioners during the year 6.293 linear miles ; many square feet have been discontinued without changing the mileage ; 24 linear feet have been discontinued ; corrections to previous measurements on account of abolishing grade crossings, and surrender of streets to the Park Department, show a decrease of 1.98 miles, making a total net increase of 4.31 miles.

Not included in the above table, there are about 142 miles of private ways and alleys which are not under the care of this department.

The rate of increase from year to year is shown in the following table :

1859.....	111.50 miles.	1883.....	367.99 miles.
1871.....	201.32 "	1884.....	374.10 "
1872.....	207.4 "	1885.....	379.60 "
1873.....	209.24 "	1886.....	383.55 "
1874.....	313.90 "	1887.....	390.30 "
1875.....	318.58 "	1888.....	392.72 "
1876.....	327.50 "	1889.....	397.84 "
1877.....	333.2 "	1890.....	404.6 "
1878.....	340.39 "	1891.....	409.6 "
1879.....	345.19 "	1892.....	434.59 "
1880.....	350.54 "	1893.....	443.34 "
1881.....	355.5 "	1894.....	447.65 "
1882.....	359.85 "		

Areas of Pavements.

The following table shows the areas of pavements in square yards, arranged by districts :

	Asphalt	Block.	Brick.	Cobble.	Telford and Macadam.	Gravel.	Not graded.	Totals.
Feb. 1, 1893.	100,812	1,615,925	3,638	57,321	3,820,830	2,264,965	220,217	8,083,708
Feb. 1, 1894.								
City Proper,	*96,558	†\$94,034	3,638	35,593	569,581	10,913	1,222	1,611,539
Charlestown .	421	194,663	. . .	1,043	205,861	1,105	. . . . .	403,098
E. Boston	104,206	. . .	. . .	3,470	38,118	386,208	3,731	535,733
S. Boston	7,609	244,457	. . .	1,192	390,809	38,365	83,599	766,031
Roxbury	6,559	163,425	. . .	408	969,522	260,268	28,274	1,428,456
W. Roxbury	2,067	. . .	. . .	. . . . .	482,227	711,681	33,727	1,229,702
Dorchester,	74,594	. . .	. . .	. . . . .	805,971	555,365	36,036	1,471,966
Brighton . . . . .	. . . . .	. . .	. . .	. . . . .	415,609	281,129	32,539	729,337
Total	111,147	1,677,451	3,638	41,706	3,877,758	2,245,034	219,128	8,175,862

* Of this amount, 13,586 sq. yds. = asphalt blocks.

† Of this amount, 42,619 sq. yds. = granite-block paving on concrete with pitched joints.

Total area of public streets, 8,175,862 sq. yds.

For the sake of comparing the character of the pavements in the city of Boston with that of other large cities, statements were received direct from the cities named, which cannot be classified exactly on the same basis on account of the differences in the laws by which they become public, but which will show in a general way what styles of roadway have been adopted in the several large cities by percentage :

Distribution of Pavements in Public Highways.

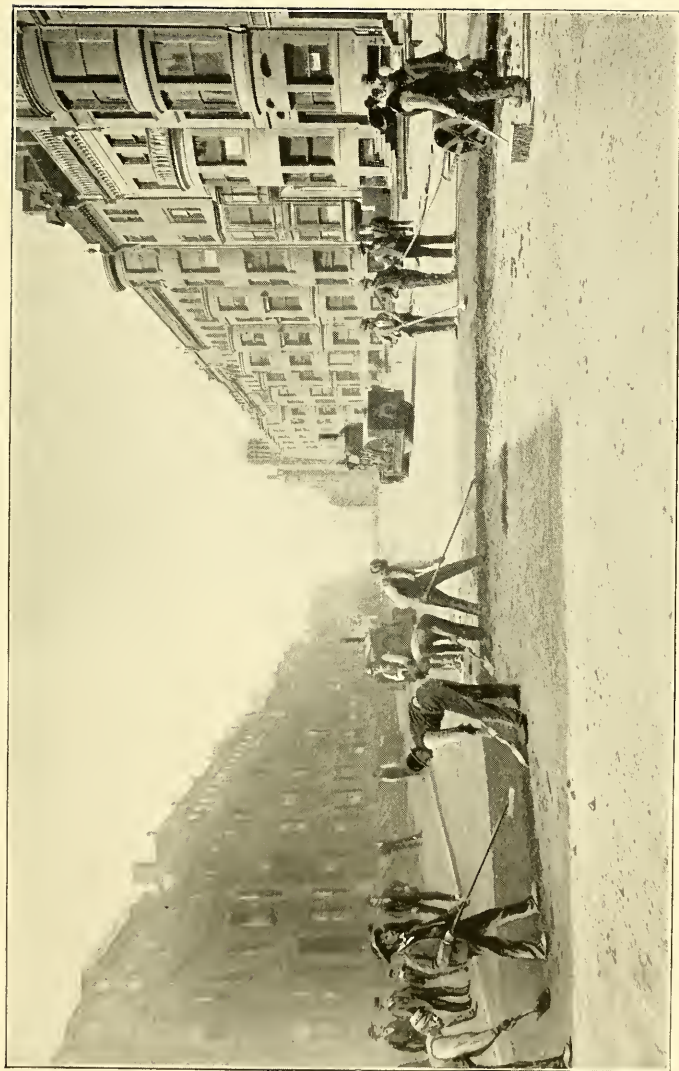
	Washington. Per cent.	St. Louis. Per cent.	Chicago. Per cent.	Buffalo. Per cent.	New York. Per cent.	Philadelphia. Per cent.	Boston. Per cent.
Sheet asphalt . .	43.90	2.40	1.65	37.97	11.42	9.2	1.26
Coal-tar	15.74	.....	.....	.....	.....	.....	.....
Asphalt block . .	7.56	.....	0.36	0.08	0.05	2.2	0.18
Block stone . .	15.82	12.50	2.51	30.25	72.28	24.4	17.35
Wood . . . . .	.....	2.40	64.38	.....	.....	.....	.....
Cobble	8.98	.....	.....	.....	0.06	31.0	0.79
Vitrified brick . .	.....	.....	0.11	0.81	.....	5.8	0.08
Rubble . . . . .	.....	.....	0.11	.....	.....	13.4	.....
* Telford . . . . .	.....	9.60	.....	0.13	.....	.....	10.12
* Macadam	8.00	73.10	30.86	0.47	16.19	13.4	37.18
* Gravel and dirt .	.....	.....	.....	30.26	.....	.....	33.04
Burnt clay . . . .	.....	.....	0.02	0.03	.....	.....	.....
Granolithic . . . .	.....	.....	.....	.....	.....	0.6	.....
Percentages . .	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Mileage	165.00	365.83	1,007.05	396.4	455.75	852.14	447.65

* Not usually well separated in the reports of the various cities.

The most striking feature of the above table is the fact that Boston shows such a small percentage of paved streets, and still further, that every other city shows from two to thirty times as much sheet asphalt as Boston. Well may Buffalo boast of being the best-paved city in America, with its one hundred and fifty miles of asphalt and one hundred and twenty miles of block-stone pavement, or two hundred and seventy odd miles of improved pavement, out of a total mileage of three hundred ninety-six miles, as against our eighty miles, mostly of stone pavement, out of a mileage of four hundred and forty-seven miles.

Asphalt pavements in Europe are said to have the following approximate areas and lengths :

	Square Yards.	Miles.
London	370,000	24
Paris	401,617	26
Berlin	1,280,796	83
Other cities	271,000	18
	<hr/> 2,323,413	<hr/> 151



BEACON STREET.

Laying Trinidad Lake Asphalt on Cement Concrete Base.

The city of Buffalo alone has more miles of asphalt than all the cities in Europe, where these pavements have been in use since 1854, while the industry has only been developing in this country for sixteen years. In this short time the United States and Canada are said to have laid in seventy-five cities upwards of 14,000,000 square yards or 3,000 acres, and an aggregate length of nearly 800 miles.

Such cities as Scranton, Pa., Wilkesbarre, Erie, St. Joseph, Mo., Louisville, Ky., all contain more asphalt than Boston, while Omaha has five times as much, Washington ten times as much, and Buffalo thirty times as much. This condition of things largely increases the expense of the maintenance of pavements in this city, as the excessive mileage of unpaved streets not only calls for large expenditures for repairs, but the expense of cleaning is increased from \$12 per mile to seventy-five dollars (\$75), and in some cases to over one hundred dollars (\$100) per mile.

The unevenness and irregularity of slope of some of our older pavements are appalling, due in some cases to a poor foundation or bed, and in some to the free and unrestricted license to private corporations in former years to tear up a pavement without a guarantee of its proper replacement, and to locate drip-boxes, manholes, gate-boxes, and covers of various sizes and kinds, all without due attention to the established grade and crown of the streets.

The inevitable conclusion, both from the comparison of our scant mileage of pavement with other cities, and from the consideration of the inferior, not to say disgraceful, condition of many of our older business streets that have not been repaved for many years, is that a strong effort should be made to provide means for the replacing of these pavements with more perfect and sanitary forms of pavement. Such pavements should be extended as rapidly as possible until they cover the majority of our streets.

PAVEMENTS LAID IN 1891.

In the year 1891 several experimental pavements were laid, under varying conditions of travel, with a view of special study as to the merits of some of the newer forms of paving, notably brick paving, Hastings' asphalt-block paving, and Sicilian rock paving, all of which could be compared with the Trinidad asphalt.

Three streets were paved with brick: Genesee and Seneca streets were paved with a fire-clay brick made by the Park Fire-Clay Company of Park Quarries, Beaver County, Pa. Oswego street was paved with red brick made by the New

England Pressed Brick Company, of Rhode Island. The three streets are about five hundred (500) feet long and in the same section of the city.

Rochester street, which is of the same length and parallel with the others, was paved with Hastings' compressed asphalt blocks. All of these streets extend from Harrison avenue to Albany street, and none of them are connected in such a way as to make them thoroughfares, yet all have a fair amount of travel.

Seneca street is fourteen (14) feet only between the curbs; the others are about twenty (20) feet between curbs. The cost of paving with fire-clay brick on gravel foundation (Seneca and Oswego streets) was \$2.75 per square yard, the contractor preparing the bed and furnishing all materials.

The cost of the red New England brick (Oswego street) was \$2.40 per square yard, on the same conditions. Compressed asphalt-block paving (Rochester street) cost about \$2.85 per square yard, exclusive of the cost of preparing the roadbed, which cost about 40 cents, making the total cost about \$3.25; the price paid for asphalt-block paving includes a five-year guarantee on maintenance.

West Newton street, from Shawmut avenue to Columbus avenue, was paved with Hastings' blocks in the same year, and cost \$3.10 per square yard, exclusive of preparing the roadbed, which cost about 27 cents per square yard, making the total cost about \$3.37 per square yard, with a five-year maintenance guarantee. The contract for brick paving carried no maintenance guarantee.

In the same year Trinidad asphalt paving on concrete foundation cost \$3.60 per square yard on Beacon street, including guarantee of five years for maintenance; and Columbus avenue was resurfaced on the old concrete foundation, at the rate of \$2.25 per square yard, with five years' guarantee. All the paving except the Trinidad asphalt was laid on a prepared and rolled gravel bed without a concrete base.

The City Engineer was requested to make an examination of these special pavements this year, and his opinion is expressed in the following statement of their condition:

"Of the three streets paved with brick, there is not much to choose as regards their present condition; all of them are in need of repairs at the present time. There is no record that Seneca street has up to this time received any repair on account of wear. Oswego street has been repaired at a cost of \$211.

"Genesee street has been repaired at a cost of \$160.23. As there are 1,091 square yards of paving, the cost has been

about 15 cents per square yard, and about 20 cents per square yard is known to have been expended on Oswego street.

"No substantial reason is found why Seneca street should be less worn than Genesee street. Both were paved from the same lot of brick, except that Seneca street being narrower than Genesee street, it may possibly receive less travel. The condition of these streets is unsatisfactory, and shows a wear of the material, aside from an unevenness of surface, on account of defective foundation. Oswego street is in worse condition than Genesee street.

"Rochester street (asphalt blocks) shows wear on the blocks, but is in good condition. Slight repairs only have been necessary.

"Beacon street and Columbus avenue have been repaired by the contractor, and although they will require repairs this season, they are in good condition.

"The red brick paving is in the poorest condition of any examined, and next in order comes the fire brick, then asphalt blocks, and lastly the sheet asphalt, which stands the best of all. The bricks are worn and broken in places where most used. This is particularly noticeable at the entrances where teams turn as they enter.

"The same fact is noticeable in Hamilton place (private way), paved in 1888 with fire-clay brick, made in Boston. The pavement is worn at the entrance and at the end next the Music Hall where carriages turn, while it is in very good condition otherwise. The same condition obtains with the asphalt-block pavement.

"The asphalt blocks wear during cold weather by spalling off corners, and leaving the blocks rounding on the tops like old granite blocks; when warmer weather comes, the blocks soften and flatten under the traffic, and the streets appear in much better condition than earlier in the season.

"While the experience with brick paving in Boston is not encouraging, yet there is much being done in the way of producing better paving-brick, and doubtless progress has been made in the last three years, and it is recommended that limited areas be paved with the best procurable bricks, *on a concrete base.*"

The experience of other cities on this subject is not to be ignored, since many attempts have been made to put brick paving on a surer basis. The results of investigations of our own engineers seem to agree with the reports of special committees of some other cities, to the effect that while, in form, brick paving is commendable both as to cleanliness and sanitary features, yet it cannot be fully relied upon in large cities where the traffic is heavy.

It has given the best satisfaction in the smaller cities, and its principal weakness has been in the failure to produce the exact degree of vitrification and uniformity required to build a street that is impregnable throughout the entire length. Useless and costly experiments of trying to use bricks made from clays that are incapable of vitrification are unwarranted; but, taking advantage of the experience of Philadelphia, Wheeling, Newark, Columbus, Cincinnati, Kansas City, Quincy, Galesburg, Rock Island, Davenport, Detroit, and other cities noted for their brick paving, the right clay may yet be found that will stand the tests of absorption, abrasion, compression, vitrification, and the more practical test of actual street wear.

When a proper clay is found, there remains yet another problem, — how to handle and deliver the same so that the element of cost due to freight, etc., shall not have been increased to the high-water mark of granite or asphalt, whose durability is not questioned.

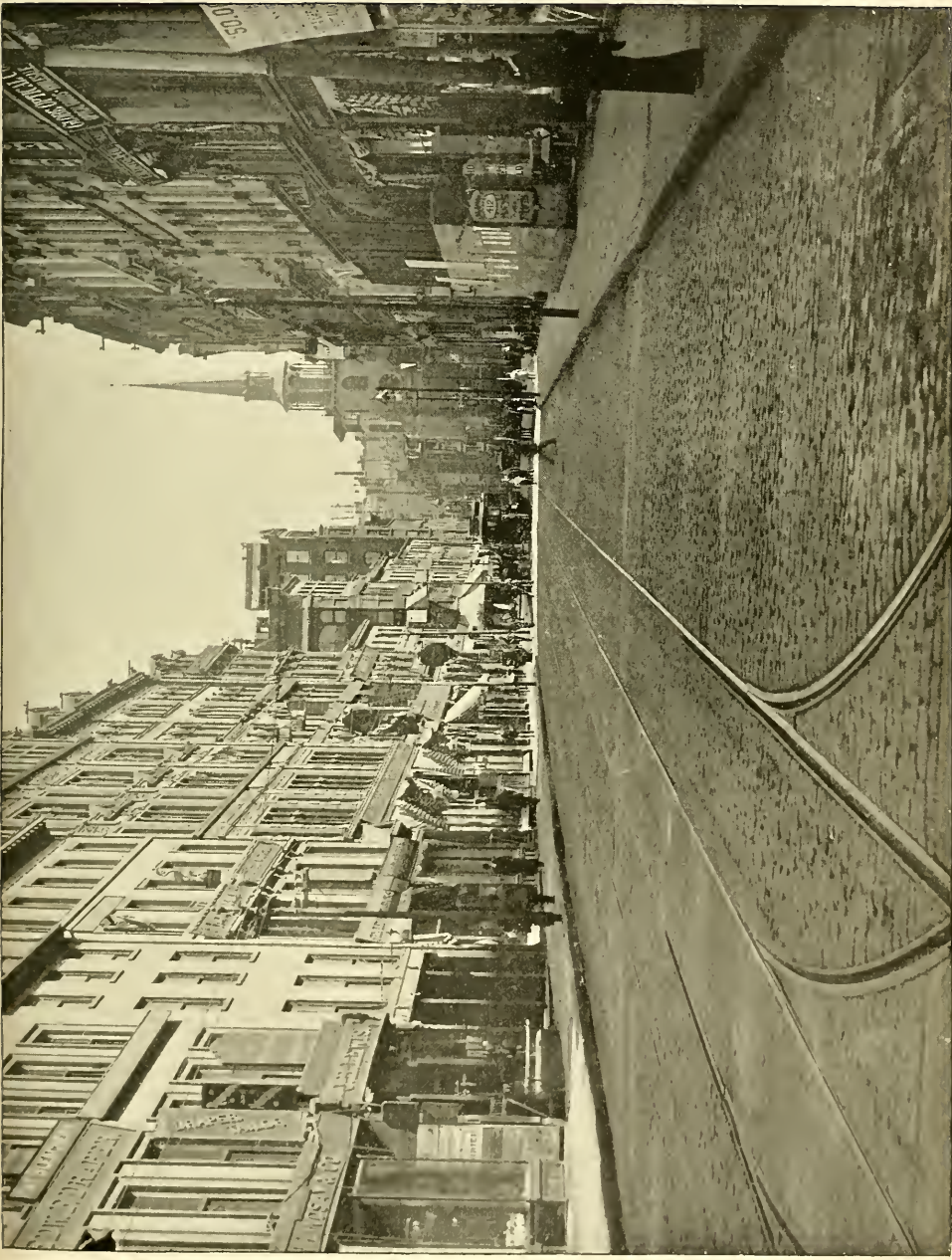
No sheet rock-asphalt was laid in 1891, but in 1892 considerable areas were laid. Two streets were laid in the near vicinity of the brick pavement; namely, Decatur street and Motte street. Davis street, parallel to these streets and lying between them, was paved with Trinidad asphalt also, in 1892. All three streets are in good condition; only one break, due to wear, having been found on them, that being in the gutter of Motte street.

It would be difficult to distinguish the natural rock-asphalt from the Trinidad asphalt by its appearance. During the examination, the policeman whose beat includes all these streets was asked if he had observed any difference in slipperiness between Davis and Decatur streets, but he could not say that one was more slippery than the other. In general, the asphalt streets continue to give excellent satisfaction.

Streets paved with granite blocks on concrete in 1891 have required no expense for maintenance, and will require none for many years. They retain their grades perfectly, are easily cleaned, shed water without trouble even where but little fall can be obtained, and, from the fact that they have been carefully graded, a marked appearance of stability is given to the street. This stable appearance is never seen after the first year in streets without the concrete base, as even small settlements or changes of form give an appearance of unstability and weakness, and this generally occurs when only the gravel base is used.



OLD PAVING — TREMONT STREET.



NEW PAVING — WASHINGTON STREET.

PAVEMENTS LAID IN 1893.

The general character of the work done during the year 1893 has been similar to that of the previous year. No conditions have developed to change the conclusions already stated as to the method of laying granite-block paving on a cement concrete base and pitching the joints.

The advantage of the concrete base is beyond dispute, while the practical superiority of the pitched joint over the gravel joint may be stated in two essential particulars: first, a newly laid pitched pavement can be opened up for travel at once, in absolutely clean condition, in contrast to the former method of covering off with gravel that must require months of travel to grind it into the joints, while in the meantime the alternate mud and dust thus created is a source of annoyance and discomfort to the abutters; and, second, the tight joint prevents the surface-water from leaking through into the sand-bed and washing it out from under the blocks, and thus causing them to settle. Neither should the point be lost sight of or ignored that if the street wash is carried at once by an impervious pavement and gutter directly into the catch-basin, and thence into the drainage system, the sanitary condition of the street is immediately changed. No longer can there exist the process of fermentation and putrefaction of the confined masses of stagnant street liquids, animal and vegetable matter, that fill every crevice and hollow between and under the blocks where joints are left open. If such a source of danger to public health can be thus removed, the benefits received more than offset the temporary annoyance of the tar-kettle and the additional cost of the pitching.

Large blocks have been preferred, measuring in width from three and a half ($3\frac{1}{2}$) to four and one-half ($4\frac{1}{2}$) inches; in length, from nine (9) to fourteen (14) inches; and averaging not less than eleven and one-half ($11\frac{1}{2}$) inches; and in depth, from seven and one-half ($7\frac{1}{2}$) to eight (8) inches. They have cost seventy-three and one-half dollars (\$73.50) per M., delivered on the wharves. No brick pavements have been laid during the year. Too much care and attention cannot be given to the design of manhole frames and covers, as to form, dimension, non-perishable material, and location, as they tend to break up the general evenness and true slope of the theoretical cross-section, if laid irregularly, and also lead to an uneven wear of the pavement due to the extra hammer blows of heavily loaded vehicles passing over these jogs. Both Trinidad and Sicilian rock-asphalt have been

laid during the year, and continue to give good satisfaction when laid in localities to which they are adapted.

The following statement of the City Engineer contains the main features of the special work of construction assigned to him by this department for engineering supervision :

CITY OF BOSTON, ENGINEERING DEPARTMENT,
50 CITY HALL, February 1, 1894.

MR. H. H. CARTER, *Superintendent of Streets* :

SIR : I herewith submit the following report of the work done under my direction for the Street Department during the year 1893 :

The following are the principal items of work done :

Block-stone paving on a concrete base laid with pitch joints, 569.5 square yards, at an average cost of about \$4.75 per square yard.

Block-stone paving on a gravel base laid with pitch joints, 1,816.5 square yards, at an average cost of about \$3.50 per square yard.

Block-stone paving on a gravel base with gravel joints, 24,583.8 square yards, at an average cost of about \$3 per square yard.

Trinidad sheet-asphalt on a concrete base, 7,361.3 square yards, at an average cost of about \$3.75 per square yard.

Sicilian rock-asphalt on a concrete base, 2,734.5 square yards, at an average cost of about \$3.75 per square yard.

Edgestones set, 15,765 lineal feet. Brick sidewalks laid, 11,124 square yards. Flagging crosswalks laid, 847 square yards.

The following is a statement of the streets paved, for which plans were made, lines and grades given, and the work supervised :

Arch Street. — From Milk street to Franklin street was resurfaced above the old concrete base, with Trinidad asphalt, by the Barber Asphalt Company. The surface removed was asphalt.

Beacon Street. — From Tremont to Bowdoin street was paved with granite blocks, with pitch joints, on a gravel base. The surface removed was macadam. The edgestones were reset and brick sidewalks put in order; contractor, F. H. Cowin & Co. Two new catch-basins were built, one on Somerset street and one on Beacon street.

Beacon Street. — From Gloucester street to W. Chester park was paved with Trinidad asphalt by the Barber Asphalt Company. The concrete base was laid by the Metropolitan Construction Company, and edgestones and sidewalks put

in order by F. H. Cowin & Co. The surface removed was macadam.

Bennington Street, East Boston. — From Marion to Chelsea street was paved with granite blocks on a gravel base. The edgestones were reset and brick sidewalks put in order. The surface removed was macadam. Contractors, Doherty & O'Leary. The street railroad was relocated, and the edgestones set on new lines. Three new catch-basins were built.

Carver Street. — From Eliot to Pleasant street was paved with granite blocks on a gravel base. The edgestones and sidewalks were put in order. The surface removed was cobble pavement. Contractors, F. H. Cowin & Co.

Condor Street, East Boston. — From Border to Meridian street was paved with granite blocks on a gravel base. The edgestones and sidewalks were put in order. The surface removed was macadam. Contractors, Doherty & O'Leary.

Cove Street. — From South to Kneeland street was paved with granite blocks on a gravel base and the edgestones and brick sidewalk put in order. The old cobblestones were removed by J. J. Sullivan, and the remainder of the work was done by the Street Department. The surface removed was cobble pavement.

Dwight Street. — From Tremont to Shawmut avenue was paved with natural rock sheet-asphalt by H. Gore & Co. The concrete base was laid by the Metropolitan Construction Company. The surface removed was macadam. One new catch-basin was built.

East Sixth Street, South Boston. — From K to L street was paved with granite blocks on a gravel base, and the edgestones and sidewalks were put in order. The surface removed was macadam. Contractors, H. Gore & Co.

Exchange Street. — From State street to Dock square was paved with granite blocks with pitch joints on a concrete base. The old granite paving-blocks were removed by J. J. Sullivan. The concrete base was laid by the Metropolitan Construction Company, and the paving and brick sidewalks were laid by F. H. Cowin & Co.

Fay Street. — From Dover street to Harrison avenue was put in order for paving with natural rock asphalt on cobblestones. On account of the lateness of the season, before the sewer and gas pipes were put in condition, the asphalt was not laid. Contractors, H. Gore & Co. The edgestones and brick sidewalks were put in order.

Fulton Place. — From Fulton to North street was paved with granite blocks on a gravel base, and the edgestones

and brick sidewalks were put in order. The surface removed was cobble pavement. Contractors, James Grant & Co.

Lehigh Street. — From Albany street to South street was paved with granite blocks on a gravel base, and the edgestones and sidewalks were put in order. The surface removed was cobble-stone paving. The tracks of the Albany-street freight railroad were rebuilt, and regraded to allow more head room under Broadway bridge than before. Four new catch-basins were built and the location of five others changed.

Kemble Street. — From Gerard street westerly 318 feet was paved with granite blocks on a gravel base; edgestones were set and gravel sidewalks built. The surface removed was gravel. Contractors, Doherty & O'Leary.

Market Street. — From Merrimac street to Portland street was paved with granite blocks on a gravel base; and the edgestones and brick sidewalks were put in order. The surface removed was macadam. Contractors, H. Gore & Co.

Maverick Street. — From New street to Border street was paved with granite blocks on a gravel base, and the edgestones and brick sidewalks were put in order. The surface removed was cobble pavement. Contractors, Doherty & O'Leary.

Mystic Avenue. — From Main street to Boston & Maine Railroad bridge was paved with granite blocks on a gravel base. The edgestones and brick sidewalks were put in order. The surface removed was macadam. Contractor, P. Brennan.

New Street, East Boston. — From Maverick street southerly 281 feet was paved with granite blocks on a gravel base, and the edgestones and brick sidewalks were put in order. The surface removed was cobble-stone paving. Contractors, Doherty & O'Leary.

North Hudson Street. — From Hull street to Snow Hill street was macadamized. The gutters were paved, edgestones were set, and the sidewalks were paved with brick. The surface removed was gravel. Contractor, D. N. Payson.

Park Street, Charlestown. — From City square to Warren street was paved with granite blocks on a gravel base. The street was widened and the work of paving is not quite complete on account of the unfinished condition of new buildings. The street railroad was regraded. The edgestones were reset and brick sidewalks were put in order. Surface removed was granite-block paving. Contractor, P. Brennan.

Parmenter Street. — From Hanover street to Salem street was paved with Trinidad asphalt by the Barber Asphalt Company. The concrete base was laid by the Metropolitan Construction Company. The former surface was a so-called asphalt pavement. The sidewalks were in good condition.

Rutherford Avenue, Charlestown. — From Allen street to Cambridge street was paved with granite blocks on a gravel base, and the edgestones and brick sidewalks were put in order. The surface removed was macadam. One new catch-basin was built. The contractor was John Turner & Co.

South Eden Street, Charlestown. — From Hancock square to Rutherford avenue was paved with granite blocks on a gravel base; the edgestones and brick sidewalks were put in order. The surface removed was cobble-stone pavement. Contractors, John Turner & Co.

South Margin Street. — From Pitts street to Prospect street was paved with granite blocks on a gravel base. The old cobble-stones were removed by J. J. Sullivan, and the work of paving was done by the Street Department. The edgestones and brick sidewalks were put in order. Two new catch-basins were built.

Spring Lane. — From Washington street to Devonshire street. This lane has been discontinued as a way for teams and is used for foot travel only. It was regraded and paved with Hastings' compressed asphalt blocks laid on a concrete base. The base was laid by the Metropolitan Construction Company, and the paving was done by J. Turner & Co. The surface removed was a granite paved roadway with brick sidewalks. One new catch-basin and one drop inlet were built.

Wesley Street, Charlestown. — From Sullivan street to Pearl street was paved with granite blocks on a gravel base. Edgestones were set and the brick sidewalks were put in order. The surface removed was cobble pavement. Contractor, P. Brennan.

W. Broadway, South Boston. — From Gardner place 150 feet easterly was paved with natural rock-asphalt on a concrete base, by H. Gore & Co. The surface removed was granite-block pavement. Edgestones were reset and the brick sidewalks were put in order.

The work of properly adapting the grades of street railroads to the surface of the street has taken much time and labor. The success of new pavements depends upon this being carefully done, and it cannot be properly done without also arranging the grades for paving, even if the paving

is not done at the same time. Grade plans have been prepared and given to the railroads in the following cases :

NORFOLK SUBURBAN STREET RAILWAY.

River Street. — From Hyde Park line to Blue Hill avenue.

WEST END STREET RAILWAY.

Battery Street. — At the North Ferry.

Boylston Street. — From Arlington to Exeter street.

Boylston Street. — From W. Chester park to Bothnia street.

Bennington Street. — From Marion to Putnam street.

Bennington Street. — From Putnam to Chelsea street.

Broadway Extension. — From Harrison avenue to Lehigh-street bridge.

Beacon Street. — At West Chester park.

Causeway Street. — At Merrimac square.

City Square, Charlestown. — Partly built.

Dartmouth Street. — From Boylston street to Huntington avenue.

East Eighth Street. — From Old Harbor to Hamlin street.

Huntington Avenue. — From north of West Chester park to 2,950 feet south of Gainsborough street.

Lehigh Street. — From Albany to South street.

Park Street, Charlestown. — From City square to Joiner street.

Scollay Square.

Washington Street. — From Essex street to Boylston square.

MISCELLANEOUS WORK.

The following miscellaneous work has been done :

Sewall-Street Extension. — Plans and estimate for retaining-wall.

The wall has been built by the Street Department force.

Howell Street, Dorchester. — The filling has been measured and two small retaining-walls were constructed.

Washington Street, West Roxbury. — Plans for a retaining-wall, with two sets of entrance steps were made, and the construction supervised.

West Chester Park. — Bridge over Boston & Albany Railroad, and approaches were regraded. (See special report, p. 45.)

Bushnell-Street Extension. — Plan for construction made.

L Street. — Between First street and bridge. A plan for

a wooden fence on the bulkhead was made, and the work supervised. The work was done by the Street Department; also, plans were made for iron fences on two retaining-walls on the same street. The iron fence was built by George W. McLauthlin & Co., at a cost of \$276.

Congress Street. — From A street to L-street bridge. A plan for a plank sidewalk and fence was made. The work was begun by the Bridge Division of the Street Department, and was unfinished at the close of the working season.

Athens Street and I Street. — Plans showing condition of old so-called asphalt pavement have been made.

Surveys, plans, and estimates for improving and paving the following streets have been made :

Adams Street, Dorchester. — An estimate of cost of retaining-wall at Cedar Grove cemetery.

Battery Street. — North Ferry.

Ruth Street. — East Boston.

East Street. — South to Federal street.

Savoy Street.

Pemberton Square.

Warren Street, Charlestown. — From Winthrop to Soley street.

Vine Street, Charlestown. — From Tufts to Moulton street.

Mason Street. — From Tremont to West street.

Beacon Street. — From Charlesgate East to Charlesgate West.

E. Ninth Street. — Old Harbor to H street. Surveys, plan, and estimate for plank sidewalk and fence were made.

Dorchester Avenue. — Near Washington street (Dorchester Lower Mills). Estimates were made of the cost of building two retaining-walls.

A very large number of preliminary estimates have been made for paving and improving streets.

NEW STREETS.

In September four contracts were made by the Street Department for building streets, under the provisions of chapter 323 of the Acts of the Legislature of 1891, as amended by chapter 418 of the Acts of 1892, by which the entire expense of construction is borne by the abutters. In these streets, sewer, gas and water pipes, with house connections to the sidewalk, are laid in advance of the street construction.

Batavia Street. — About 936 feet long; this street was

built by James Grant & Co., at a total cost of \$7,809.39. The itemized prices and quantities are shown on the tabular statement accompanying this report. (See Appendix B.)

Miner Street. — About 319 feet long, is still incomplete, the construction of two retaining-walls delaying the work until the winter prevented its completion. The work is substantially completed with the exception of rolling and finishing the roadway. A retaining-wall was built next to the Brookline branch of the Boston & Albany Railroad, at the end of the street, and another against the back yard of a house, where the right to slope the filling could not be obtained. These walls were built by John Sutherland, and cost \$1,298.35 and \$875.90, respectively.

Bay State Road. — From Raleigh street to Sherborn street, 1,389 feet long, and

Deerfield Street. — From Commonwealth avenue to Charles river, 572 feet long, — are still incomplete. The contractor is James Killian. These two streets have a macadam roadway with gravel sidewalks. Batavia and Miner streets have a Telford base with brick sidewalks.

Commonwealth Avenue. — Work has been carried on during the entire year on the construction of Commonwealth avenue. The contract for filling one roadway between Brookline and Brighton avenues, by the Boston Contracting Company, was completed in September, 1893.

The total amount of filling deposited, under the contract, was 161,119 cubic yards. For 46,640 cubic yards of this amount, $49\frac{1}{2}$ cents per cubic yard was paid, amounting to \$23,086.80. Under the modification of the contract, dated October 1, 1892, 114,832 cubic yards of filling was delivered at 37 cents per cubic yard, for transportation, loading, and unloading, amounting to \$42,487.84, the city buying the filling directly from the owners of the gravel bank. In July the contract was extended to include about 30,000 cubic yards of material, to be deposited near Cottage Farm bridge, on space that had been acquired by the city since the date of the original contract. Including the sum of \$7,000 paid the contractors, by order of the city government, to reimburse them for extraordinary losses on account of displacement of material in the hollow near Cottage Farm bridge, the whole amount paid to the contractors was \$72,444.03.

In April a contract was made with Robert A. Davis for building a section of the Telford foundation of the northerly roadway, about 1,500 feet long, between Brookline avenue and Granby street. This is a heavy Telford road. The city furnished edgestones and granite blocks for gutters. The contract did not include furnishing broken stone for the sur-

face, or the labor upon it. The amount paid under this contract was \$15,010.37.

In July a similar contract was made with F. H. Cowin & Co. for building the continuation of the same roadway for 1,700 feet, and within about 300 feet of Cottage Farm bridge. The amount paid under this contract was \$16,-207.07.

The broken stone for the completion of this road was furnished by the Massachusetts Broken Stone Company, and delivered on the road. Including the construction of the very large intersection at the crossing of Commonwealth avenue and Beacon street, which was built by the Paving Division, the total quantity of stone delivered by the Massachusetts Broken Stone Company was 9,330 tons. The price paid was \$1.90 per ton, amounting to \$17,728.80.

Placing and rolling this stone was done by the men and steam-rollers of the Paving Division.

A contract was made in July with John T. Scully for building a wooden bulkhead on the northerly side of the avenue near Cottage Farm bridge, for the purpose of retaining the filling and in place of an expensive retaining-wall. The cost of this work was \$850.

In November a further contract was made with the Boston Contracting Company, after public advertisement, for furnishing and delivering about 65,000 cubic yards of filling on the remaining width of the avenue between Brookline avenue and St. Paul street. Work was not commenced on this contract until January 15, 1894, and but a small quantity of filling was deposited before February 1. The contract price is 41 cents per cubic yard, measured in the bank.

The work done on the avenue during the year may be summarized as follows:

The northerly roadway between Brookline avenue and St. Paul street has been filled and the road built as far as Cottage Farm bridge, and the filling has been commenced for the southerly roadway. The design of the avenue provides for two roadways, — the northerly one 45 feet wide, the southerly one 35 feet wide, with a central loamed space 33 feet wide. The northerly sidewalk is to be 15 feet wide, with a planting space 10 feet wide between the sidewalk and the roadway. The southerly sidewalk is 10 feet wide, with a planting space 12 feet wide. Gas, water, house sewer, surface-water drain, and telegraph poles are all placed in the side planting spaces and under the sidewalks.

When houses are built, they can be connected to any of these without breaking up the street.

During the winter, material for Telford base has been

accumulated on the ground in readiness for work in 1894, and soundings have been made for the construction of the bridge over the Boston & Albany Railroad at Cottage Farm station.

BROADWAY BRIDGE (OVER FORT POINT CHANNEL.)

All of the floor-beams of the fixed spans on this bridge have been strengthened by the addition of hard-pine timber. In each of the spans adjoining the draw, a hard-pine truss has been erected, to which the floor system has been attached, and the spans over Lehigh and Foundry streets have been strengthened by hard-pine stringers resting on timber trestles in the streets below. This work was done by William L. Miller, under a contract dated September 30, 1893.

The table showing the total length of public streets in Boston, and the areas of the various classes of pavement, has been corrected to February 1, 1894.

[Signed]

WILLIAM JACKSON,
City Engineer.

Edgestones and Sidewalks — New Edgestones. (Lin. ft. set.)

	YEAR.	City Proper.	Roxbury.	South Boston.	East Boston.	Dorchester.	West Roxbury.	Brighton.	Charlestown.	Total.
Laid under the law of 1872.	1881 .	6,294	8,328	6,304	443	13,112	1,314	263	794	36,852
	1882 .	3,398	10,930	4,190	2,119	8,235	5,454	5,543	1,595	41,464
	1883 .	2,763	7,306	4,660	98	2,467	4,381	1,895	. . . .	23,570
	1884 .	4,691	9,733	6,189	2,450	18,310	4,610	106	696	46,785
	1885 .	5,291	4,644	2,538	1,333	4,976	1,952	303	546	21,583
	1886 .	5,790	8,978	2,463	349	11,051	2,451	737	174	31,993
	1887 .	3,222	10,192	4,269	436	5,229	2,726	2,055	223	28,352
	1888 .	4,359	5,191	4,531	971	5,051	580	867	. . . .	21,550
	1889 .	2,946	13,224	2,139	1,419	6,794	10,404	1,845	573	39,344
	1890 .	2,781	11,475	4,946	981	9,882	3,288	3,042	988	37,383
	1891 .	8,236	22,693	11,724	4,131	18,138	4,617	2,032	2,227	73,798
	1892 .	9,222	25,506	9,631	11,238	36,859	9,970	9,001	2,804	114,231
	1893 .	1,118	14,979	4,375	1,969	10,587	4,795	3,981	. . . .	41,804
	Total .	60,111	153,179	67,959	27,937	150,691	56,542	31,670	10,620	558,709

Brick Sidewalks. (Sq. yds. set.)

YEAR.	City Proper.	Roxbury.	South Boston.	East Boston.	Dorchester.	West Roxbury.	Brighton.	Charlestown.	Total.	
Laid under the law of 1872.	1881 .	5,207	11,491	3,961	893	337	1,096	381	159	23,525
	1882 .	5,905	7,510	4,984	1,658	179	1,834	117	887	23,074
	1883 .	4,392	7,675	4,794	1,095	2,795	3,354	. . . .	177	24,282
	1884 .	4,870	7,279	4,437	1,616	4,902	954	. . . .	739	24,797
	1885 .	4,756	3,896	1,473	722	892	479	46	342	12,606
	1886 .	5,273	5,285	2,112	1,002	2,843	. . . .	58	527	17,100
	1887 .	5,970	7,693	3,768	1,500	1,348	643	. . . .	56	20,978
	1888 .	2,540	6,910	3,164	1,116	614	346	. . . .	75	14,759
	1889 .	4,835	10,489	1,942	1,362	638	124	138	. . . .	19,528
	1890 .	4,913	7,651	1,915	1,947	1,155	274	900	791	19,546
	1891 .	3,881	9,098	3,628	2,176	1,473	967	377	120	21,725
	1892 .	10,423	20,231	4,484	12,847	10,462	2,905	1,068	3,451	65,871
	1893 .	964	5,912	751	2,197	2,412	350	. . . .	175	12,761
Total .	63,929	111,120	41,413	30,125	30,055	13,326	3,085	7,499	300,267	

The laying of edgestones and sidewalks from 1881 to 1891 was done under the laws of 1872.

Chapter 50 of the Acts and Resolves of that year provided that " . . . the Mayor and Aldermen or Selectmen or Road Commissioners may establish and grade sidewalks in such streets as, in their judgment, the public convenience may require, and may assess the abutter on such sidewalks one-half of the expense of the same. All assessments so made shall be a lien upon the abutting lands, and be collected in the same manner as taxes on real estate."

" . . . The Mayor and Aldermen or the Selectmen or Road Commissioners may grade and construct sidewalks and complete partially constructed sidewalks in any street as the public convenience may require, with or without edgestone, and may cover the same with brick, flat stones, concrete, gravel, or other appropriate material, and may assess not exceeding one-half of the expense proportionally upon the abutters on such sidewalks. . . . "

The cost to the city of Boston of laying the edgestones and brick sidewalks, shown in the foregoing table, from 1881 to 1891, was \$581,230.21.

Of this amount the sum of \$277,698.88 was assessed on the abutters.

Of this sum of \$277,698.88 the sum of \$10,810.48 was abated by order of the Board of Aldermen, and the balance (\$266,888.40) was paid into the city treasury.

The entire half cost of this work (\$290,615.10) was not assessed, for the reason that it was a common practice for individuals to furnish the materials for the sidewalk, such as brick and edgestones, whereupon the department laid the same at no expense and with no assessment to the individual, on the theory that the furnishing of the materials offset the assessment of one-half of the total cost which would have been made, provided the department furnished both the labor and materials. The cost of the labor which entered into the laying of the edgestone and sidewalks laid in this manner (where the abutters furnished the materials) is included in the total cost; whereas the half assessment was only made on the edgestone and sidewalks where the department furnished both labor and materials.

This law, while it had the effect of obliging the abutter on the sidewalk to pay only one-half the cost of the work, and was therefore favorable to him in that respect, provided no special appropriation from which could be defrayed the proportion of the expense which the city of Boston was obliged to assume.

The cost of this work came out of the so-called regular maintenance appropriation of the Street Department, or else out of such special loans for street improvements as were made from time to time by the city government.

On account of the limited amount of money which could be spared for the purpose of laying edgestones and constructing sidewalks from the maintenance appropriation of the Street Department, the practical effect of the old law was that hundreds of unsatisfied petitions for the construction of sidewalks were on file in the office of the Superintendent of Streets, and these petitions remained on file sometimes for several years before they were granted.

To provide a remedy for this state of affairs and enable all applications to be promptly attended to, the present administration interested itself in the Massachusetts Legislature to obtain the passage of the following act:

[CHAP. 401 OF THE ACTS OF 1892.]

AN ACT RELATING TO SIDEWALKS IN THE CITY OF BOSTON.

Be it enacted, etc., as follows:

SECTION 1. The mayor and aldermen of the city of Boston may pass an order that the superintendent of streets of said city may make a

sidewalk along any highway or part thereof in said city, specifying in the order the locations, heights, widths, and materials for the sidewalks, and said superintendent shall carry out such order.

SECT. 2. Any expenses incurred for any work so ordered and performed shall be paid out of the moneys appropriated under the provisions of section one of chapter three hundred and twenty-three of the acts of the year eighteen hundred and ninety-one, and shall be repaid to said city as the assessable cost of the work by the owners of the several parcels of land bordering on the part of the highway along which the sidewalk is made; *provided, however*, that if any such parcel is devoted to public use, said city may assume and pay the whole or part of the amount assessed thereto, if said city shall deem proper so to do.

SECT. 3. Said superintendent shall so apportion the said assessable cost to the parcels of land aforesaid that the amount apportioned to each parcel shall bear to the total assessable cost the proportion which the number of lineal feet of each parcel on said highway bears to the number of such lineal feet of all such parcels, and a lien shall attach to the parcel and to any buildings which may be thereon for such amount, as a part of the tax on such parcel. Said superintendent shall give notice of the amount of every such assessment to the owner of the estate assessed therefor, forthwith after the amount has been determined.

SECT. 4. The provisions of sections sixteen, seventeen, and eighteen of chapter three hundred and twenty-three of the acts of the year eighteen hundred and ninety-one and acts in amendment thereof shall, so far as applicable, apply to all assessments made under this act.

SECT. 5. Sidewalks in said city shall hereafter be made and paid for only in accordance with the provisions of this act, the provisions of chapter three hundred and twenty-three of the acts of the year eighteen hundred and ninety-one, and acts in amendment thereof.

SECT. 6. This act shall take effect upon its passage.

Approved June 16, 1892.

Section 2 of the foregoing act provides that the expense shall be defrayed out of money appropriated under the provision of Section 1 of Chapter 323 of the Acts of 1891, as amended by Chapter 418 of the Acts of 1892, commonly known as the "Laying Out and Constructing of Highways" act, which is as follows:

CHAP. 323 OF THE ACTS OF 1891, AS AMENDED BY CHAP. 418 OF THE ACTS OF 1892.

AN ACT RELATING TO THE LOCATION, LAYING OUT, AND CONSTRUCTION OF THE HIGHWAYS IN THE CITY OF BOSTON.

Be it enacted, etc., as follows:

SECTION 1. The city of Boston shall annually, by ordinary vote, appropriate money sufficient to meet the salaries and expenses incurred under sections four, five, and six of this act, and any deficiencies of interest and sinking-fund requirements to be paid by the treasurer of the city of Boston from the appropriation herein specified, as provided in section eighteen, and may by such vote appropriate one or more additional amounts in gross for carrying out the other provisions of this act; the money so appropriated shall be obtained from the sales of the bonds and certificates provided for in section two, and shall constitute an appropriation for the purposes of this act; the total of all amounts so appropriated in any one year shall not exceed one million dollars, nor shall the total amount of all such bonds and certificates outstanding

ever be more than three million dollars in excess of the sinking-funds established for the payment of said debt.

Under this act an annual appropriation of not more than one million dollars (\$1,000,000) could be made by the city of Boston for the purpose of laying out and constructing of highways, the constructing of sidewalks, and the constructing of sewers.

This appropriation was not considered in the determination of the authorized limit of indebtedness of the city, and could therefore be made annually by ordinary vote. The practical effect of this law was to provide a large sum of money available for the purposes of sidewalk construction, so that all petitions for this work in the future could be promptly satisfied. The effect of it is plainly visible in the table on page 68, showing the greatly increased amount of work done in 1892.

The change in the law by which the abutters, instead of defraying one-half of the cost of the work, were obliged to defray the whole cost, created some dissatisfaction. This dissatisfaction arose largely from the fact that the citizens of Boston up to the year 1892 obtained street, sidewalk, and sewer improvements largely at the expense of the general tax-levy.

In no other city in this country is such a method pursued. In many cities the whole expense of the paving of a street, the expense of building a sidewalk, and the expense of the sewer is charged directly on the abutting property. In other cities a proportion varying from one-half to three-quarters of the entire expense is charged to the abutters. This method permits these cities to do enormous amounts of paving, sewer, and sidewalk work, the expense of which is not defrayed from money raised by general tax, but is assessed directly on the abutters. In some cases, where all the work is done by contract, the contractor is paid by certificates issued as a bill against the abutting property, and he is obliged to collect his money directly from the owners.

The previous law concerning the payment by the city of a large proportion of the expense of sewers and sidewalks has had the effect of retarding public improvements of this character, and it was only under the laws of 1892 that improvements of this character could be carried out as fast as they were demanded.

Notwithstanding that the law of 1892 was satisfactory, inasmuch as improvements in the nature of sidewalks could be carried out as fast as demanded by the public, a rural legislator representing that portion of the community who

believe that all work on streets, sewers, and sidewalks should be conducted largely at the expense of the general tax-levy, succeeded in getting the law of 1892 repealed and a new law passed.

This law is as follows :

[CHAP. 437 OF THE ACTS OF 1893.]

AN ACT IN RELATION TO SIDEWALKS IN THE CITY OF BOSTON.

Be it enacted, etc., as follows :

SECTION 1. The board of mayor and aldermen of the city of Boston may grade and construct sidewalks, and complete any partially constructed sidewalk in any street of such city as the public convenience may require, with or without edgestones, as said board shall deem expedient, and may cover the same with brick, flat stones, concrete, gravel, or other appropriate material, and may assess upon the abutters on such sidewalks in just proportions, not exceeding one-half of the expense of the same; but all assessments so made shall constitute a lien upon the abutting land, and be collected in the same manner as taxes on real estate are now collected; and such sidewalks, when constructed with edgestones and covered with brick, flat stones, or concrete, shall afterwards be maintained at the expense of such city. When any such sidewalk shall be permanently constructed with edgestones and covered with brick, flat stones, or concrete, as aforesaid, there shall be deducted from the assessment therefor any sum which shall have been previously assessed upon the abutting premises and paid to the city for the expense of the construction of the same in any other manner than with edgestones and with brick, flat stones, or concrete as aforesaid; and such deduction shall be made *pro rata* and in just proportions from the assessments upon different abutters who at the time of such assessments are owners of the estate which at the time of such former assessments was the estate of the abutters who had previously paid such former assessments.

SECT. 2. In estimating the damage sustained by any party by the construction of sidewalks as aforesaid there shall be allowed by way of set-off the benefit, if any, to the property of the party by reason thereof.

SECT. 3. All acts and parts of acts inconsistent with this act are hereby repealed.

SECT. 4. This act shall take effect upon its passage. [*Approved June 9, 1893.*]

The practical effect of this law is to stop all sidewalk and edgestone improvements. In the law of 1892 it was specified that the cost of this work (which was on the completion of the work charged to the abutters and therefore returned to the city treasury) should be originally paid from the appropriation of \$1,000,000 which could be annually made under Chapter 323 of the Acts of 1891 as amended by Chapter 418 of the Acts of 1892 (previously quoted).

In the 1893 law no provision whatever has been made for an appropriation from which the cost of edgestones and sidewalks can be made, and construction will therefore cease until such time as a proper law is passed similar to the one of 1892.

The work done during the year 1893 under the 1893 law has been done in the districts where specific loans were available for street improvements.

It is interesting to observe the effect that liberal laws concerning the construction of sidewalks have on the carrying out of public improvements of this character. As an example of such laws the following ordinance of the city of Philadelphia is quoted :

The ordinance passed February 11, 1889,

Provides whenever in the judgment of the Director of the Department of Public Works, the footways or sidewalks of any public streets in the city of Philadelphia shall require to be graded, paved, repaved or repaired, or the curbstones thereof to be set or reset, or it shall be necessary to reset curbstones in accordance with the ordinances relating to the laying of improved pavements in the cartways of public streets, it shall be the duty of the Director of the Department of Public Works, and he is hereby authorized, to give written notice to the owner or owners of the property adjoining which any of such work is required to be done, to do such work at their own cost or expense within thirty days from the date of such notice, and on the failure of any such owner or owners to comply with such notice within the time specified therein, it shall be the duty of the Director of the Department of Public Works, and he is hereby authorized, to cause the necessary work to be done under the contract entered into in accordance with the provisions of this ordinance.

SECT. 3. Upon the completion of any work done under the contract entered into by virtue of this ordinance, it shall be the duty of the Director of the Department of Public Works, and he is hereby authorized, to estimate the cost and expense thereof, in accordance with the provisions of the contract therefor, and to assess such cost and expense against the property adjoining which the work is done, in the name of the registered owner or owners thereof, and the said Director shall then cause bills for said work to be made out in duplicate against each property, one copy of which shall be served on the registered owner or owners of such property, or in case he or they cannot be found, the same shall be left upon the premises, and the other copy of the said bill shall be endorsed by the Director of the Department of Public Works, in favor of the contractor or contractors, and be delivered to him or them in lieu of cash as provided in the first section of this ordinance, and if the same be not paid within thirty days from the service thereof upon the owner or owners of the property, a lien therefor, together with the penalty of ten per cent. for non-payment, may be filed in the proper court against the respective properties, and the registered owner or owners thereof, in the name of the city to the use and at the expense of the contractor, who may in the name of the city, but at his own expense, take all necessary legal proceedings for the enforcement of said lien, and also employ all other legal remedies for the collection of said claim together with the penalty aforesaid, to which the city may be competent.

From this ordinance it will be seen that property owners are liable for the entire cost of construction and maintenance of the curbing and footway paving. The property owner is notified to curb and pave, or reset curb, and repave footways in front of property owned by him. In case of neglect to

do so within thirty days from date of service of notice, the city contractor is directed to do the work according to the specifications prepared by the Department of Public Works.

The laws concerning the construction of sidewalks in Chicago, St. Louis, and other large cities in this country are similar to the above-quoted law, and the following table is given to show the results obtained under the laws governing this question in Boston and those in force in the other cities of this country :

Cities.	Number of square yards brick sidewalks laid in 1893.	Number of square yards stone and granolithic laid in 1893.	Wood.	Total.
Boston	12,761	0	2,500	15,261
Philadelphia ...	0	420,000	0	420,000
Chicago	0	487,132	829,547	1,313,679
St. Louis	17,700	49,100	0	66,800

From comparing the above table with table on page 69, it is seen that the city of Philadelphia laid more square yards of sidewalk in 1893 than the city of Boston laid in the twenty-two years prior to 1892.

The sidewalk was also of better material and was much more expensive, as an ordinary brick sidewalk costs approximately \$1.25 per square yard, whereas a granolithic or concrete sidewalk costs about \$2 per square yard.

STREET OPENINGS.

Sixteen thousand five hundred and nineteen permits were granted during the past year to open streets. The excavations made under these permits aggregate 222.9 miles in length, and show the extent of this work.

The Street Department has been accustomed to grant to the various gas and other companies, whose work would in certain cases admit of no delay, a so-called "emergency permit," which allowed excavations to be made without special permission being obtained, the only requirement being that a daily return of openings made under this form of permit should be forwarded to the office of the Superintendent.

Two thousand one hundred and ninety-nine openings of an average length of six feet each were made under "emergency permits," for breaks in water and gas pipes which

were alleged to require immediate attention. These openings were made under 79 permits.

In addition to the above permits, various other permits have been issued to pedlers, mechanics, and others, for different purposes, 10,251 in number, making the total number of permits issued 26,928.

It may here properly be mentioned that real-estate owners are extremely careless in providing sewer and water connections for their several buildings, both old and new, in streets that are advertised to be improved and regulated, and frequently call for a permit to open for gas, water, or sewer connections soon after the department has put down a permanent pavement. It is believed that this trouble will remedy itself in time, as the public is gradually finding out the difficulty of obtaining permits where the department has recently done work.

The enforcement of the new ordinances of 1892 and the new regulations in regard to hawkers and pedlers in the retail district, as incorporated in the permits issued last year, has resulted in freeing the retail district of what has been considered the greatest of nuisances to pedestrians and the public generally, who formerly were besieged at every step to stop and trade on the street, thus blocking off travel in either direction and leading to much confusion and annoyance.

In general it has served to open up the sidewalks to the use of the travelling public, for whom they were originally made, while at the same time the restrictions are such as to give the abutting merchants a proper use of their immediate sidewalk as far as necessary for the proper conduct of their business.

STREET-WATERING.

The work of street-watering has been carried out during the year on the same general method that was laid down the year previous.

The watering of *paved* streets at the city's expense was entirely discontinued, and the appropriation of \$100,000 devoted to the watering of macadamized streets only. About 29½ miles of paved streets were watered by contractors at the expense of the abutters, who seem to be willing to pay for the continuance of this work.

While the department has no special objection to contractors watering paved streets at the expense of the abutters, it is found that frequently a nuisance is created. The contractors are unable to collect their money from subscribers until the end of the watering season, and if any complaint has been made on account of dust, there is frequently a dispute concerning the payment of the stipulated amount. The contractors are, therefore, very careful to avoid this trouble, and prefer to deluge the streets with water, so that no possible dispute can arise concerning the payment of their bills.

In this way the streets are kept wet and greasy, and it becomes difficult to clean them. To remedy this trouble the department prohibited the watering of paved streets after 4 P.M., so that they might have a chance to dry out preparatory to the night sweeping.

As the privilege of being allowed to water paved streets at the expense of abutters is undoubtedly a valuable one to the contractor in many sections of the city, all contractors who obtain this privilege will be obliged, during the coming year, to agree to water, free of cost to the city, all macadamized streets within their districts.

This order will result in the watering of about five miles of macadamized streets at no expense to the city.

This method seems preferable to the one adopted in New York, where the privilege of watering paved streets is sold by the city to contractors.

During the past year the macadamized streets of the South End and Back Bay districts were watered by contract at the city's expense. All other watering of macadamized streets has been done by carts hired by the day. A gratifying increase in efficiency has been obtained over the work done the previous year, as will be seen by an inspection of the table on page 79.

This is partly attributable to better organization and supervision, and partly to improved equipment.

A large number of new water-posts have been erected during the year, and, as a result, carts do not have to waste time in travelling long distances to obtain fresh supplies of water, and therefore cover more distance while engaged in actual watering.

Owing to regulations made last year, the old-style cart with copper sprinkler has been about done away with, and the carts now in use by the department are of modern manufacture.

The following table shows the changes that have been effected in the style of hired water-carts in use during the past two years :

	Old Copper.	Studebaker.	Abbott Downing.	Potter Patent.	
1892... ..	61	4	16	27	108
1893.....	2	45	33	14	94

Considering the fact that contractors are only sure of one season's work, and that a possible change of administration may result in their carts lying idle for an unknown length of time, the change from old-fashioned carts to new ones was effected with considerable reluctance.

Considerable difficulty was experienced, as in former years, in watering streets both in early spring and late fall while the thermometer was below freezing. It is impossible to keep the water permanently turned on in the water-posts, until such time as there is no possibility of the temperature dropping below the freezing point. This necessitates the shutting off of the water-supply every night, and consequent delay in turning the supply on in the morning, with the result that during March, April, and November it is impossible to keep the streets continuously watered.

The watering season of 1893 lasted the unusual length of 195 working days, watering being commenced on the 19th day of March.

On April 9th, 200 water-valves were frozen and burst, owing to a sudden fall in temperature.

The following table gives a summary of the work done by teams hired by the day and teams owned by the city, classified by districts, with the number of miles covered in each district :

Summary of Day Work paid for by the City.

No.	DISTRICT.	Number of teams hired by the day.	Number of teams owned by city.	Number of miles covered.
1	So. Boston....	9	.....	21.50
2	East Boston....	7	.....	16.50
3	Charlestown ...	7	.....	15.00
4	Brighton.....	11	2	31.25
5	West Roxbury .	15	2	58.07
6	Dorchester....	16	1	51.10
7	Roxbury	18	.....	52.72
8	South Yard	1	.....	2.08
9	Back Bay... ..	2	.....	3.55
10	North Yard ....	.....	1	1.64
11	Beacon Hill....	2	.....	4.04
	Total	88	6	257.45

This summary shows that eighty-eight (88) carts hired by the day and six (6) carts owned by the city have watered 257.45 miles of streets this year, as compared with 230.12 miles of streets watered with eighty-seven (87) carts last year.

The expense of this work was borne entirely by the city. The cost of day work and city work, exclusive of supervision, was \$298 per mile, or \$76,725.

These carts averaged about 2.74 miles per day, as against 2.64 last year. Watering was begun on the nineteenth of March, and continued up to December 1 in some districts. As the watering covered a longer period this year than last, the expense was slightly more per mile, although greater efficiency was obtained.

The West Roxbury carts averaged 3.42 miles per day; the Dorchester carts averaged 3.00 miles per day; the Back Bay carts averaged 1.78 miles per day.

1893.

Summary of Contract Work paid for by the City.

DISTRICTS.	Contractors.	Carts.	Miles.	Cost.
Back Bay.....	M. E. Nawn.....	9	12.49550	\$6,947 27
South End.....	O. Nute & Son	4	9.36891	* 4,764 13
Totals.....	.....	13	21.86441	\$11,711 40

* \$250 additional is yet to be paid to the contractor.

This summary shows that thirteen (13) carts were used by the contractors to water 21.86441 miles, of which 5.938 miles were watered with salt water, and 15.924 miles were watered with fresh water, paid for entirely by the city. The amount of money paid out for contract work was about \$5,100 less than for the same work last year.

The contract price in Back Bay was \$890 per mile for salt water, and \$575 per mile for fresh water. The contract price in South End was \$630 per mile for salt water, and \$460 per mile for fresh water.

These prices are much lower than the prices obtained the year previous, and cannot be reduced to any great extent and allow a profit to the contractor. As the contract runs for two years, the city will have the benefit of these prices during the coming year.

1893.

Work done by Contractors at the Expense of the Abutters.

DISTRICT.	Contractors.	Carts.	Miles.
City Proper.....	Daniel Clark.....	3	3.67
City Proper.....	Potter Bros.	5	8.75
City Proper.....	Proctor Bros. & Billings ..	5	7.25
City Proper.....	O. Nute & Son	0½	1.50
Roxbury and South Boston,	H. P. Cook & Co.	3	6.51
East Boston	Philip Sowden	0½	0.50
Roxbury.....	William Gilligan.....	1	1.25
Totals.....	.....	18	29.43

The expense of the watering of these streets was borne entirely by the abutters. This table shows that with eighteen (18) carts these contractors watered 29.43 miles of paved streets in the City Proper, South Boston, East Boston, and Roxbury. About 2,300 feet of asphalt on Columbus avenue and West Newton street was also watered at the expense of the abutters.

1893.

Summary of Work done, which was paid for by the City.

No.	DISTRICT.	Miles, day work.	Miles, contract work.	Total miles.
1	South Boston...	21.50	.....	21.50
2	East Boston....	16.50	.....	16.50
3	Charlestown ...	15.00	.....	15 00
4	Brighton	31.25	.....	31.25
5	West Roxbury..	58.07	.....	58.07
6	Dorchester.....	51.10	.....	51.10
7	Roxbury	52.72	.....	52.72
8	South Yard	2.08	9.36	11.44
9	Back Bay	3.55	12.49	16 04
10	North Yard	5.68	.....	5.68
	Totals.....	257.45	21.85	279.30
		or about	or about	
		3,398,357 sq. yds.	478,891 sq. yds.	

Cost of day and city work, exclusive of supervision, \$298 per mile.

Cost of contract work, exclusive of supervision, \$535.64 per mile.

The extra cost of the contract work is accounted for by the fact that this work is done in districts having a great amount of travel; the streets are also wide and mostly unshaded, so that a cart is obliged to water the streets more frequently than in other districts.

Total cost of contract, day, and city work, \$88,436.40.

The above expense is the cost exclusive of supervision, new carts, water-posts, etc. Water was furnished by Boston Water Works at no expense.

1893.

**Distribution of Carts, showing the Entire Amount of
Work done.**

No.	DISTRICT.	City carts.	Hired carts.	Contractor's carts.	Total.	Miles.
1	South Boston ..	.....	9	1	10	23.25
2	East Boston...	.....	7	0½	7½	17.00
3	Charlestown ...	.....	7	.....	7	15.00
4	Brighton....	2	11	.....	13	31.25
5	W. Roxbury ...	2	15	.....	17	58.07
6	Dorchester.....	1		.....	17	51.10
7	Roxbury .....	.....	18	3	21	58.73
8	City Proper	1	5	26½	32½	54.33
	Totals	6	88	31	125	308.73

Money Expended, 1893.

No.	Districts.	City carts.	Contract work.	Hired carts.	Labor.	Water-posts.	New carts and repairs.	Horse-hire.	Sundries.	Total.
1	South Boston.....	.....	.....	\$7,170 00	\$493 59	\$107 50	.....	.....	.....	\$7,771 09
2	East Boston . . . . .	.....	.....	5,748 00	497 61	259 96	.....	.....	.....	6,505 57
3	Charlestown.....	.....	.....	5,778 00	497 58	122 00	.....	.....	.....	6,397 58
4	Brighton	\$1,728 00	.....	9,165 00	497 60	269 40	\$199 10	.....	.....	11,859 10
5	West Roxbury..	1,503 00	.....	12,090 00	803 00	141 36	950 00	.....	.....	15,487 36
6	Dorchester	771 00	.....	12,234 00	875 57	151 95	432 85	.....	.....	14,465 37
7	Roxbury .....	.....	.....	14,646 00	880 54	359 03	.....	.....	.....	15,885 57
8	City Proper	577 50	\$11,711 40	5,314 50	1,146 24	634 55	440 00	\$670 00	\$564 33	21,058 52
	Totals.....	\$4,579 50	\$11,711 40	\$72,145 50	\$5,691 73	\$2,045 75	*\$2,021 95	\$670 00	\$564 33	\$99,430 16

* Three new Studebaker carts included.

The following table shows the amount expended in street-watering, by the city, for the last sixteen years :

1878	.	.	\$23,595 02	1886	.	.	\$44,940 35
1879	.	.	26,747 18	1887	.	.	51,365 73
1880	.	.	33,306 95	1888	.	.	40,586 58
1881	.	.	36,178 24	1889	.	.	47,837 46
1882	.	.	45,797 00	1890	.	.	57,967 34
1883	.	.	53,502 29	1891	.	.	104,263 62
1884	.	.	34,518 47	1892	.	.	94,507 80
1885	.	.	43,854 68	1893	.	.	99,430 16

WATER-POSTS.

In order to improve the service this year, 23 new water-posts were erected in different localities. Nine water-posts were changed for various causes, mostly on account of new streets and new buildings being built where the pipes were formerly located.

The following table shows their location by district :

District.	1891.	1892.	1893.	Increase over 1892.
South Boston.....	23	25	27	2
East Boston	16	23	28	5
Charlestown	19	19	20	1
Brighton.....	25	39	42	3
West Roxbury	50	59	60	1
Dorchester.....	61	72	75	3
Roxbury	53	60	65	5
City Proper.....	24	42	45	3
Total	271	339	362	23

Great assistance has been rendered in the work of street-watering by the Boston Water Board in promptly furnishing new water-posts, turning on or shutting off water, and in many other ways.

INCOME.

The Street Department during the year watered streets in front of 106 public schools, 13 police-stations, and 31 engine-houses, and received the following sums for this work :

Police-stations	.	.	.	.	\$192 57
Engine-houses	.	.	.	.	411 95
Louisburg square	.	.	.	.	100 00
					<hr/>
Total	.	.	.	.	\$704 52

Owing to lack of appropriation, the School Board were unwilling to pay for the watering of streets in front of school-houses, and the Street Department lost the usual income from this source, amounting to about \$2,500.

Louisburg square (a private way) was watered by the department as in former years at an expense to the abutters of \$100.

In the report for 1892 it was stated that "a close inspection of the results accomplished this year (1892) with those of last year shows that the cost of the work done by the city had decreased, and that the distances covered per day with each team employed by the city has shown an increase. This is the natural result of better organization and supervision, and an increase in economy and efficiency may be confidently looked for during the year 1893."

This prediction has been realized, and it is believed that the close study which has been given to the subject of street-watering by the department, for the last three years, has resulted in a large financial saving to the city.

The cost per mile of streets watered shows that great economy has been attained, and the results compare favorably with those attained by any city in the country.

SANITARY DIVISION.

The work of the Sanitary Division includes the removal of house offal and the removal of house and store dirt and ashes.

The following table shows the number of loads of offal collected and removed in the last ten (10) years :

AMOUNT OF HOUSE OFFAL REMOVED.

Year.								No. of Loads.
1884	.	.	.	.	.	.	.	28,520
1885	.	.	.	.	.	.	.	31,206
1886	.	.	.	.	.	.	.	33,170
1887	.	.	.	.	.	.	.	36,724
1888	.	.	.	.	.	.	.	37,409
1889	.	.	.	.	.	.	.	40,183
1890	.	.	.	.	.	.	.	40,525
1891 ¹	.	.	.	.	.	.	.	46,742
1892	.	.	.	.	.	.	.	46,343
1893	.	.	.	.	.	.	.	51,415

Each load of offal is equivalent to fifty-seven (57) cubic feet, and weighs one and one-half ($1\frac{1}{2}$) tons.

The above table does not include previous to the year 1893 the amount collected by contract in East Boston and Brighton, which amounted to about 5,100 loads per year. Of the amount (51,415 loads) collected during the year 1893, 3,744 loads were collected by the East Boston contractor, and 1,395 loads were collected by the Brighton contractor, leaving 46,276 loads collected by city teams.

The collection of this material is attended to in winter by an average regular force of 62 city offal carts and 175 men, and on contract work 8 offal carts and 16 men; making a total of 70 offal carts and 191 men. At different times, and especially in summer, an extra force of 21 teams and 42 men are employed.

Complaints received concerning the failure of the division to promptly remove offal usually show on investigation that either the offal has not been properly separated from ashes or other house refuse, as is insisted on in this city, or else that the receptacles were deposited in some inaccessible place. If householders would see that the employees have easy access to the receptacles, and that the men are not

¹ From January 1, 1891, to February 1, 1892, or 13 months.

unnecessarily delayed in this work, the service would be greatly facilitated. The blocking of yards and alleys with snow invariably leads to complaints, as this necessitates either the removal of offal through the residences, or neglect till the alleys are passable.

The disposal has been made during the year in the manner described in last year's report, viz.: The offal from the markets, and offal that is decayed, is put on board a scow and towed to sea; the offal of Charlestown is taken to the yard at Malden bridge and then disposed of to farmers; the offal of East Boston is collected by contractors, and is removed to Revere; the offal of the City Proper, South Boston, and Dorchester is conveyed to the yard at the South End, and disposed of to farmers, who remove it daily; the offal of Roxbury and West Roxbury is conveyed to the yard on Highland street, and disposed of to farmers; and the offal of Brighton is collected by contract, and disposed of outside of the district.

For three years this subject has been agitated in the public press, but no change has been inaugurated in the method of disposal, although the sale of offal to farmers, who feed it to pigs which are afterwards brought to market in this city, has been severely condemned.

The effect of the agitation that has been going on for the past three years is plainly visible in the receipts of the department for the sale of offal, which have fallen off in a marked degree.

COLLECTION AND DISPOSAL OF OFFAL.

YEAR.	Total amount collected.	Amount sold.	Amount dumped on scow and towed to sea or wasted.	Per cent. wasted to total collection.	Amount of receipts from sales.
1891 ¹	42,616 loads.	40,492 loads.	2,124 loads.	5 per cent.	\$30,672 65
1892	46,343 "	30,773 "	15,570 "	33 " "	21,282 82
1893 ²	46,276 "	30,824 "	15,363 "	30 " "	20,790 03

This falling off in receipts is accounted for by the fact that the Boards of Health of many suburban towns have prohibited the carrying on of piggeries within the town limits. Many farmers have therefore been obliged to dis-

¹ Twelve months. Above table does not include contracts in East Boston and Brighton.

² In East Boston, 3,744 loads; Brighton, 1,395 loads; total, 5,139 loads, collected during 1893, are not included in above table. For 1891 and 1892 East Boston and Brighton were estimated at 5,100 loads.

continue the raising of pigs, and the market for the city's offal is becoming more and more restricted.

It is probable that the practice of selling offal for food purposes will be prohibited by the Legislature during the coming year, and that a radical change in the method of getting rid of this material must be inaugurated by the city.

The method of disposal at sea of part of the city's offal has been successfully carried out during the past year, and will be continued unless the city government makes provision for some sanitary method of disposal by cremation or utilization. It is possible, even in this event, that a certain amount of offal will be towed to sea, owing to the cheapness of this method.

The position of dumping-stations is shown on the chart.

A complete description of all the utilization and cremation processes in use in this country was made in last year's report. This report, taken in connection with that of the committee for the disposal of offal, which made an extended tour throughout the country, and rendered an elaborate report (City Document No. 91, 1893), gives valuable information on this subject. The only new utilization process brought to notice during the year is the process of the New England Construction Company, a description of which follows :

THE NEW ENGLAND CONSTRUCTION COMPANY.

Process.

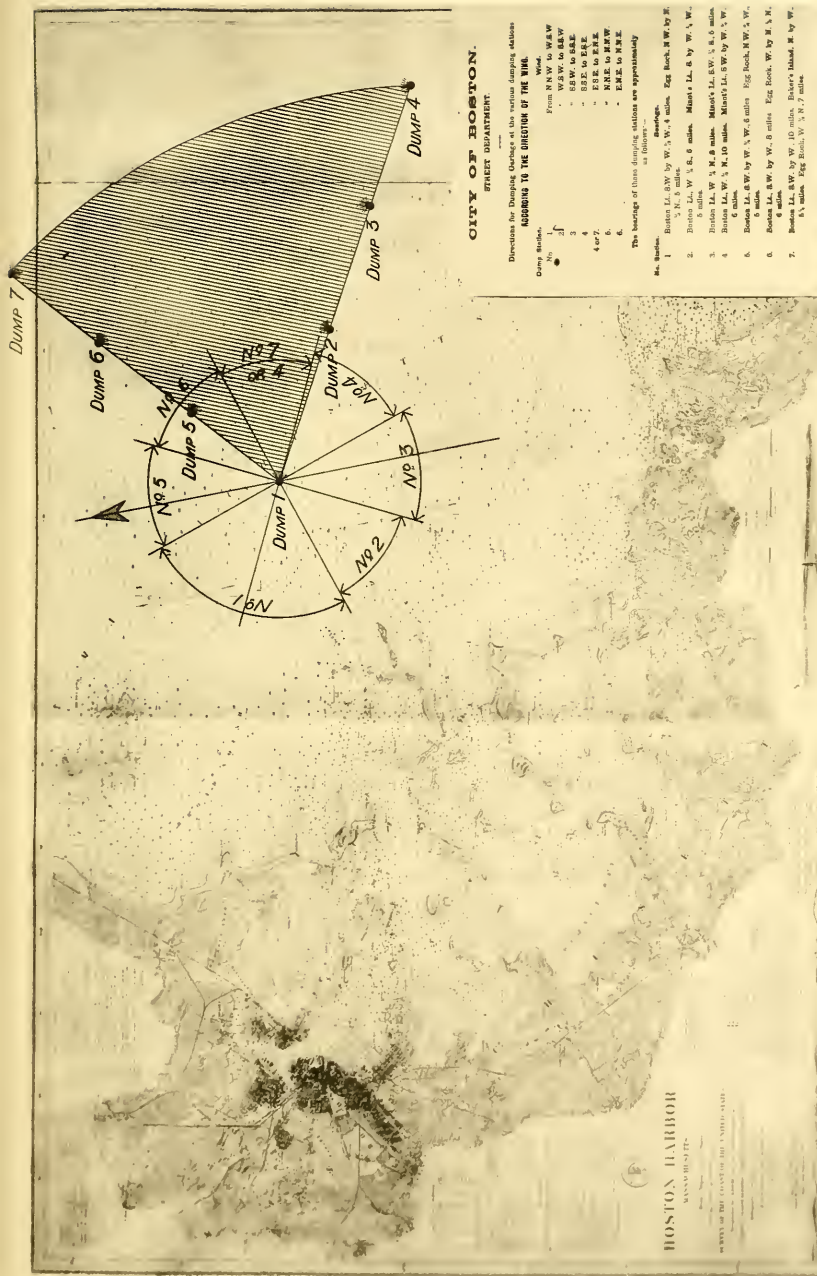
The patented process owned by this company consists in reducing house offal to its component parts in a manner which is perfectly sanitary and free from noxious or deleterious odors.

Plant.

The plant consists of a stack of steel digestors holding from five to ten tons each, built in a steel frame-work, and arranged in a triangle or pentagon, a closed receiving-tank, settling vats for grease, presses, driers, and grinders.

Operation.

The offal when received is hoisted to a large hopper, central to the stack, from which a pipe leads to the mouth of the digestors. The garbage passes through the hopper into a digestor, and when the digestor is filled, the orifice is closed, and steam at a temperature of 300 degrees or more is introduced. The jets of steam are so arranged that the whole mass is subjected to its influence, and all germs and bacteria are immediately destroyed. At the same time, the passage of the steam reduces the mass into its component parts, which are animal and vegetable matter. The product of the animal matter is oil, which is carried to the settling vats, and ammonia and phosphates, which are held in suspension in the tankage. The vegetable matter is reduced



by this process to 20 per cent. of its original volume, and is drawn off as tankage into receiving-tanks.

The steam which enters carries off all the gases which result from reduction, into a condenser, where they are condensed into clean water, which is allowed to flow off. The tankage in the receiving-tank is raked and placed in presses, then carried to the drier and then to the grinder, after which it is ready for shipment. During the processes of drying and grinding, all steam and odors arising from the operation are carried off by an exhaust into a separate condenser. The raw material of one day is ready for shipment the next day, as a finished product.

Construction.

The entire construction of stack is of steel, the building is of iron, and the flooring of slate and iron, making an absolutely fire-proof construction.

The above process was thoroughly investigated during the year at Washington, D.C., where it had been in use, and also at Wakefield, Mass., where an experimental station has been erected by the company.

The process is a sanitary one, and is well adapted for use in cities of over 35,000 inhabitants. There can be no objection to the erection of a plant of this description in the city proper, as the process is entirely unobjectionable.

It can only be a question of a very short time when the city of Boston must adopt some such plant as that of the New England Construction Company for the purpose of treating its offal.

CREMATION OF OFFAL.

In last year's report it was mentioned that the Brown Developing Company, or more correctly "The American Garbage Cremator Company," erected (at their own expense) an experimental furnace at the division yard on Albany street, and were conducting experiments, under the supervision of the Street Department, with a view of ascertaining the exact cost of *burning* offal.

The process is one of cremation, and no attempt is made to extract any of the valuable constituents of the offal.

A brief description of their furnace, as given by the inventor, is as follows:

THE BROWN CREMATORY.

The Brown Crematory of standard size is 43 feet in length, with an inside width across the grate of 9½ feet. It stands about 9 feet high. It is constructed with thick walls of fire-brick. This fire-brick, furthermore, is glazed on its inner surface with boracic acid, a preparation which protects the brick from the action of all aqueous gases, and keeps it from disintegrating under the influence of the great heat. Surrounding the furnace on the outside is a water-jacket, in which water is constantly moving. This preserves the exterior of the furnace at an even

temperature; it keeps the brick annealed, and greatly retards any tendency to disintegration. It is a well-known fact that furnaces supplied with this water-jacket have been known to endure in active service for many years.

Combustion.

At one end of the furnace, near the top, is situated the combustion chamber, into which enters the burner. This burner or gas generator consists of a cylinder composed of three concentric pipes. The innermost of these pipes contains steam, the second pipe crude petroleum, while the third pipe contains mixed gases, which have been drawn out from the combustion chamber itself and which are now returned to it. These three pipes, emptying their contents at the same time, have this effect: the steam converts the oil to gas, and this gas in turn mingles with the gases of the outer pipe, forming a new gas of the highest combustibility. This is ignited as it enters the combustion chamber. It is subjected to three transverse currents of superheated air, one entering from either side and one from the back of the chamber. Then, in a state of high combustion, it is driven by a blast over the bridge that separates the combustion chamber from the grate, and is sent with great force and volume over the mass of offal. This voluminous flame, intensely heated and charged with oxygen, turns and passes back again under the grate, attacking the offal on its under surface, and thence goes through the flue into the smoke-stack, thus transversing the offal twice, first over its entire upper surface, and then underneath, or through a distance of 80 feet before passing through the flue into the smoke-stack. This ensures absolute and complete combustion.

The Grate.

The Brown Crematory, after many experiments, long since discarded fire-brick as a suitable substance for the construction of the grate, for the reason that fire-brick is a non-conductor of heat; and, furthermore, the action of the sodium in the offal is such as to vitrify the surface of the brick, rendering it still more a non-conductor.

In place of fire-brick, a grate has been introduced formed of cross-bars, made of a metal called "semi-steel," which is an alloy known only to the inventor, which, while it will stand an enormous degree of heat, is an excellent conductor.

These bars which comprise the grate are, furthermore, filled with brasque, a refractory material which does not readily receive or retain heat; so that, while the semi-steel that covers the brasque is heated to a high degree, and is in turn radiating its heat to the matter that comes in contact with it, this filling remains at a comparatively low degree, thus at once saving the heat for the consumption of the offal, and adding very much to the strength of the bar.

In order to secure the greatest possible area of exposure, these grate-bars are made in the form of an inverted V, rising up some ten inches from the bottom, where they are one and three-quarters inches apart, to a sharp edge.

This peculiar wedge-shaped formation of the grate-bars makes, in fact, simply a series of red-hot troughs, into which the offal falls, burning not only on top, but being consumed on both sides by the radiation of these rising wedges of highly heated steel.

The Hollow Arch.

The hollow arch is also a distinctive and most valuable feature of the Brown Crematory.

The smoke-stack consists of fifteen feet of brickwork, surmounted by fifty feet of iron.

As the Brown furnace is somewhat similar to other furnaces, the experiments made by the department on this furnace may be fairly taken to give the results that may be expected from an introduction of the system of cremation, and they are therefore of general interest in this connection.

The following is the report of the engineers assigned to this duty :

EXPERIMENTS ON CREMATION OF OFFAL.

BOSTON, March 21, 1893.

Two experiments have been made in Brown's Patent Crematory Furnace at the sanitary yard on Albany street. The furnace used was not of the above-described standard, type, and size, but consisted of a rectangular box of fire-brick about $21\frac{1}{2}$ feet long by 9 feet wide by $6\frac{1}{2}$ feet high, with a *flat* arched top and exterior braces and tie-rods of iron. It was divided practically into two equal parts by a horizontal grate made of railroad rails, and the lower part was further divided into two parts by a vertical longitudinal partition. There was a combustion chamber at one end, and a stack 50 feet high at the other end, the lower part of fire-brick, the upper part of boiler-iron.

The fuel used was petroleum (from which the kerosene had been removed) ; the burner consisted of three concentric pipes, the interior one carrying live steam, the next one petroleum, and the exterior one gaseous products of combustion drawn back from the furnace itself, as above described in the standard type.

Air, to support the combustion of the oil, was forced in by a 10-in. Sturtevant blower, through apertures on three sides of the combustion chamber.

The draft was a forced draft maintained by the blower. Steam, both for converting the oil into gas and for running the blower, was supplied by a 15-horse power boiler, which consumed, when serving both these purposes, about 400 pounds of coal in ten hours, furnishing steam at 70 pounds pressure.

The first experiment commenced February 10. Ten loads of offal were dumped near the furnace, to begin on.

This offal consisted principally of all kinds of vegetable refuse, mainly potato peelings, considerable raw fish, empty tins, glass and crockery, and much of it was frozen in masses and very wet, a rain having occurred a few days previous. The ten loads measured 20.55 cubic yards ; 1 cubic yard weighed 0.65 tons ; total weight, 13.34 tons ; 1 ton measured 1.54 cubic yards. The burning of the ten loads commenced

at 10.20 A.M., February 10, and continued until 7.30 P.M. of the same day; began again at 8.30 A.M. of February 11, and at 12.30 P.M. the last of ten loads was fed to the furnace. Allowing 20 minutes for this last portion to be consumed, it would give 13.34 tons consumed in thirteen and one-half hours, or about 1 ton, or 1.54 cubic yards, per hour.

A supplementary quantity of offal, 5 loads equal 10.20 cubic yards, equal 7.78 tons, was hauled on February 11; this was all consumed at 8 P.M. Of this offal, 1 ton measured 1.31 cubic yards; 1 cubic yard weighed 0.76 tons. Time of burning was seven hours and ten minutes, or 1.09 tons, or 1.42 cubic yards, per hour.

The total amount of offal destroyed during the two days, February 10 and 11, weighed 21.12 tons; 1 ton equalled 1.45 cubic yards, measured 30.75 cubic yards; 1 cubic yard equalled 0.69 tons.

Time of burning was twenty hours and forty minutes, or 1.02 tons, or 1.49 cubic yards, per hour.

The consumption of fuel oil was at the rate of 33 gallons per hour during the first day, and 30.94 gallons per hour the second day; for the entire two days' test the average rate was 32 gallons per hour, making for twenty and two-thirds hours 661.3 gallons total.

At 10.25 A.M. on February 11, nine of the first ten loads had been fed to the furnace; up to this point all the tin cans in the offal had been put in with the rest, but the furnace evidently becoming choked with the accumulation, they were excluded after this time.

Through the courtesy of Professors Holman and Wendell, of the Massachusetts Institute of Technology, we were able to get the temperature of the furnace. These gentlemen measured the heat February 11.

The temperatures are as follows :

Near bridge and nozzle, —

First trial	.	.	.	.	2,580° Fahrenheit.
Second trial	.	.	.	.	2,460° “
Outer end of furnace	.	.	.	.	1,850° “
Flue gases	.	.	.	.	1,680° “
Opening in top of furnace	.	.	.	.	1,760° “

At this point the inventors became dissatisfied with the performance of the furnace, and asked for delay in order to make alterations; the experiment was therefore discontinued.

It was evident that the furnace had not been well man-

aged, too large quantities of offal having been dumped in at a time, cooling and choking the furnace.

Second Experiment.

The stack having been rebuilt of larger size, the grate-bars spaced wider apart, and the upper chamber of the furnace lengthened two feet by taking that much off the combustion chamber, the experiment was resumed March 9 at 8.30 A.M. and continued without intermission until 6 P.M. on the 10th, a period of thirty-three and a half hours.

Volume of offal consumed was 71.77 cubic yards, or 2.14 cubic yards per hour. Weight of offal consumed was 44.86 tons, or 1.34 tons per hour. Volume of ashes (including tins) taken from furnace equalled 2.72 cubic yards, equalled 3.8 per cent. volume of offal.

Weight of ashes, etc., equals 1.66 tons, equals 3.7 per cent. weight of offal. About 1,340 lbs. of coal were burned under the boiler, or 40 lbs. per hour; 1,257.6 gallons of oil were used, or 37.54 gallons per hour.

The empty tins form about 4 per cent. by weight of the offal in which they are found. Up to about 3 o'clock of March 10 the tins were put into a furnace as they came in the offal, but after that time they were turned to one side and all burned together at the conclusion of the experiment. At that time enough of them had accumulated to form a layer about 18 inches deep over the area of the grate, and they were reduced to the brittleness of egg-shells in 12 minutes.

The rate of consumption per hour as given above does not give a fair idea of the capacity of the furnace.

From 8.30 A.M. of March 9, to 8.30 A.M. of March 10, 36 tons out of the total 45 tons were destroyed, or at a rate of $1\frac{1}{2}$ tons per hour; and Mr. Kidd, under whose immediate supervision the experiment was carried on, estimates that during the latter part of this period, when the furnace had attained its highest heat, the rate equalled 2 tons per hour.

This rate was the result of good management, and was obtained by putting on small quantities of offal at a time, and keeping the layer thin, which caused it to burn rapidly. At the time last named, an unfortunate misunderstanding occurred between the parties running the furnace, the management of it changed hands, the offal was dumped in in large quantities, and the result was that the remaining 9 tons took 9 hours to burn, or 1 ton per hour.

Approximate Cost per Ton and Cubic Yard.

1 engineer, at 31 cents	.	.	=	\$0 31	per hour.
1 stoker (for furnace), at 25 cents	=	25		"	
2 laborers, at 22 cents	.	.	=	44	"

Making a total of	.	.	\$1 00	"
Coal, 40 lbs.	.	.	=	10
Oil, 36 gallons, at 4 cents	.	=	1 44	

Making a total of . . . \$2 54 per hour.

Or \$1.90 per ton, or \$1.19 per cubic yard, when burning at the rate of 1.34 tons per hour; or \$1.69 per ton, or \$1.06 per cubic yard, when burning at the rate of 1.50 tons per hour.

There is no item for depreciation of plant included in the above estimate.

Third Test.

The railroad rails used for the grate-bars in the garbage furnace being replaced by bars designed for this purpose, another test was started.

April 25 — 9.15 A.M. Furnace empty and cold; 9.45 A.M., four tons of offal having been put in furnace, the fires were started.

11.15 A.M., about one ton put in. From this time the offal was put in as fast as it was consumed in loads of about one ton, until 7.05 P.M., when the last of the nineteen and one-half tons used in this test was put in the furnace.

7.45 P.M. Fire extinguished, as all the offal is reduced to ashes.

Time fires were burning = 10 hours.

Oil used, 323 gallons, or 32.3 gallons per hour.

Offal consumed, 19.5 tons +, or 1.95 tons per hour.

Approximate Cost.

1 engineer, at 31 cents	.	.	=	\$0 31	per hour.
1 stoker (for furnace), at 25 cents	=	25		"	
2 laborers, at 22 cents	.	.	=	44	"

Making a total of	.	.	\$1 00	"
Coal, 40 lbs.	.	.	=	10
Oil, 32.3 gallons, at 4 cents	.	=	1 29	

Making a total of . . . \$2 39 per hour.

1.95 tons in 10 hours, at \$2.39 per hour = \$1.22 per ton.

The ashes weighed back = 1,085 lbs., or 55 lbs. to a ton, or 2.75 per cent.

The offal was collected from hotels, and is considered the most difficult to burn.

There were practically no cans in this collection; when one was found it was thrown out, as were also the pieces of crockery and glass. No note of the weight of these few things was taken, as its effect on the result was insignificant.

Conclusions.

It is evident that the furnace should be fed lightly, and the offal kept in a thin layer, also that the tins should not be put in with the offal. If some means could be devised to press out a portion of the water in the offal without requiring too much additional handling, the efficiency of the furnace would be increased.

As to depreciation of plant there is no data upon which to base a conclusion. The furnace shows no sign of injury at present.

The inventors claim that the furnace should have been longer in order to utilize more of the heat; this claim is borne out by the fact that the temperature of the flue gases was 1,680°, the stack itself being red hot for a height of 20 feet.

It may also be granted that if a number of furnaces were set up, the items of expense for engineers and laborers would be reduced, as the same force would attend to several furnaces.

Comparison of Results.

It is interesting to compare the known results of this experimental furnace with the results obtained at Lowell during the past year, as this city has been cremating its offal and refuse for some time past.

Through the courtesy of the Lowell Board of Health the following statement has been furnished:

Total cost of running the crematory, Jan. 1, 1893, to Dec. 31, 1893, \$7,670.77.

Itemized as follows:

Coal	.	.	.	.	.	.	.	.	\$2,394 78
Oil	.	.	.	.	.	.	.	.	1,023 26
Labor	.	.	.	.	.	.	.	.	2,149 20

Carried forward,

\$5,567 24

<i>Brought forward,</i>							\$5,567 24
Plumbing	.	.	.	.	.	.	297 26
Piping	.	.	.	.	.	.	99 46
Lead	.	.	.	.	.	.	150 00
Spark-arrester	.	.	.	.	.	.	147 66
Rebuilding	.	.	.	.	.	.	553 95
Fire-brick	.	.	.	.	.	.	48 66
Carpenter	.	.	.	.	.	.	147 10
Miscellaneous	.	.	.	.	.	.	659 44
							<hr/> \$7,670 77

The work done by this crematory consisted of burning 3,500 tons of swill, 150 carcasses of animals, and infected clothing.

The cost of burning the offal varied from \$2.75 per ton in April, 1893, to \$1.15 per ton in July, 1893, with the total cost as stated above.

It would be out of the question for the city of Boston to treat the enormous amount of offal gathered daily (210 tons) in this manner, as the expense, based on actual results at Lowell, or on the experimental results obtained at Albany street (making a large allowance for a more economical result to be obtained by the erection of longer and better furnaces according to latest plans of the Brown Crematory Co.), at the cost of even 80 cents per ton to cremate the offal, would involve an immense outlay.

The method of cremation must therefore be left to those cities and towns which from their size cannot produce offal enough to warrant the erection of a utilization plant.

Recommendations were made in last year's report concerning the best method of disposing in the future of the offal of the city of Boston. The experience and knowledge gained on this subject during the last year has not changed in any way the recommendations then made, and they are therefore renewed.

First. All offal collected in the vicinity of the wharf where the present dumping-boat is located should be taken there, and then towed to sea. If new dumping-wharves are established either in East Boston, Charlestown, South Boston, or the North End, all the offal of these districts should also be disposed of at sea.

Second. A central place (such as the site of the old small-pox hospital at the South Bay or the site of the present offal-house on Albany street) should be selected and a plant erected for the disposal of offal by a utilization treatment.

It would be advisable to dispose of the offal of Roxbury, the South End, and parts of Dorchester, City Proper, and South Boston at this place. The amount of offal to be treated at this station would amount, at the present time, to about 130 tons per day, and would ultimately increase to about 160 tons per day.

Third. As the erection of a utilization-treatment plant could not be undertaken unless a considerable amount of offal can be treated, it would be necessary to establish several small cremation plants: one to be located in Brighton, another in West Roxbury, and another in Dorchester, to cremate the small amount of offal collected in these districts.

By adopting the above-described system the greatest economy would be effected, as the offal would be disposed of in the vicinity where it is collected, and the expense of hauling the material long distances would be done away with.

During the fall of 1892, 24 offal wagons were measured and contents weighed for the purpose of obtaining the capacity of wagons and the weight of offal per cart load. Their capacity averaged $3\frac{3}{4}$ cord feet, or 56.25 cubic feet, and weight averaged 3,115 lbs.

A cord equals 128 cubic feet, or 7,091 lbs.

The price per cord received by the city for the sale of offal was the same as 1892: South yard, \$4.00; Highland yard, \$5.00; Charlestown yard, \$4.00.

FORCE EMPLOYED.

CITY FORCE.		Hired Teams.	Contracts. Teams.		Total.
			E. Boston.	Brighton.	
Subforeman	1	.....	.....	.....	1
Offal clerks.....	2	.....	.....	.....	2
Teamsters.....	67	9	6	2	48
Helpers	85	9	6	2	102
Dumpers....	2	.....	.....	.....	2
Totals	157	18	12	4	191

NOTE. — For capacity of offal wagons see Appendix C.

REMOVAL OF ASHES.

The removal of ashes, house and store dirt, has been attended to during the year by a minimum force of 221 men and 103 city carts, also by five carts with an East Boston contractor, and 4 by a South Boston contractor, 4 carts by a West Roxbury contractor, and 4 carts by a Dorchester contractor. At different times, and especially during the winter months, an additional force of 50 teams and 100 men are employed.

This work shows a constant increase from year to year as will be seen in the following table, and is an indication of the actual growth of the city :

AMOUNT OF ASHES, HOUSE AND STORE DIRT REMOVED.

Year.									Number of Loads.
1882	.	.	.	.	.	.	.	.	159,197
1883	.	.	.	.	.	.	.	.	169,610
1884	.	.	.	.	.	.	.	.	182,642
1885	.	.	.	.	.	.	.	.	193,734
1886	.	.	.	.	.	.	.	.	209,129
1887	.	.	.	.	.	.	.	.	220,186
1888	.	.	.	.	.	.	.	.	233,514
1889	.	.	.	.	.	.	.	.	227,325
1890	.	.	.	.	.	.	.	.	245,730
1891 ¹	.	.	.	.	.	.	.	.	313,464
1892	.	.	.	.	.	.	.	.	303,878
1893	.	.	.	.	.	.	.	.	320,571

Each load of ashes is equivalent to 43 cubic feet.

This enormous amount of waste material is used largely for the purpose of filling low and swampy lands ; about 27 per cent. of the entire amount collected is towed out to sea and dumped.

The following table shows the disposition of this material from February 1, 1893, to February 1, 1894, together with the amount of house offal and the portion of street sweepings that were disposed of by the Sanitary Division :

¹Thirteen months, from January 1, 1891, to February 1, 1892.

	Amount col- lected.	Deposited on low lands.	Towed to sea.	Collected by con- tractors.	Sold to farmers.
	Loads.	Loads.	Loads.	Loads.	Loads.
Ashes, house and store dirt . .	320,571	233,854	86,717		
House offal	51,415	2,243	13,197	¹ 5,139	30,836
Street sweepings	33,740	. . . . .	33,740		
Total	405,726	236,097	133,654	5,139	30,836

Comparative Statement of Number of Loads of Ashes collected during 16 Weeks of the Summer and 16 Weeks of the Winter.

Summer.	Loads.	Winter.	Loads.	Difference for Winter.
May 4, 1889, to Aug. 23, 1889	60,609	Nov. 30, 1889, to Mar. 1, 1890	82,866	22,257
“ 2, 1890, “ “ 21, 1890	65,239	“ 1, 1890, “ “ 13, 1891	93,660	28,421
“ 2, 1891, “ “ 21, 1891	76,625	Oct. 31, 1891, “ Feb. 19, 1892	100,223	23,598
April 30, 1892, “ “ 19, 1892	82,034	“ 30, 1892, “ “ 12, 1893	106,772	24,738
“ 29, 1893, “ “ 18, 1893	91,721	“ 28, 1893, “ “ 16, 1894	106,851	15,130

The recommendation made in last year's report to the effect that the city acquire land in the South Bay territory is renewed.

The city would not only acquire territory which for years would be available for a central dumping-station, but the rise in valuation of this land when filled to grade 12 would be enormous, and would prove a most profitable investment. The gradual filling in of this territory would do away with the nuisance existing when these flats are uncovered. The South Bay in its present condition is a menace to the health of the community, and the city should acquire the territory and fill it in.

The filling in of low land within the city limits is progressing at such a rapid rate that the procuring of dumps convenient to the locality where the material is collected is a matter of extreme difficulty. A large amount of material has to be hauled a long distance, which adds largely to the cost of disposal.

As the amount of house and store dirt began to show a remarkably large increase, greater than could be provided

¹ This amount is included in the amount collected, 51,415; of the 5,139, 3,744 loads were collected in East Boston and 1,395 loads in Brighton.

for in the available appropriations, steps were taken to restrict the removal of store dirt, in particular by issuing the following circular to large business houses, where excessive amounts were regularly set out for collection :

STREET DEPARTMENT,
CITY HALL, BOSTON, June 30, 1893.

DEAR SIR : Under the Revised Ordinances of 1892 the Street Department of the city of Boston is not obliged to remove rubbish and dirt from stores and places of business. As it has been the practice of the department, however, for a number of years, to remove a certain amount of this material, it will continue to remove a quantity not exceeding five barrels per week from each store. The extra amount of dirt made by you over and above these five barrels will have to be provided for at your own expense on and after July 10, 1893.

In case you desire the Street Department to remove this extra amount of material, the work will be undertaken at a charge to you of fifteen cents per barrel.

Please notify this department as to the course which you desire to pursue in this matter.

Yours truly,
H. H. CARTER,
Superintendent of Streets.

Later this was followed by a second circular, designed to call attention to the fact that the city was being called upon to remove large bulky waste that was a direct production of business, and which should be destroyed or removed by the party producing it, and not by the city. This rubbish was placed in various-sized boxes and cases, irregular and large enough to fill a cart in a very short space of time, and therefore necessitating the employment of an unreasonable number of teams.

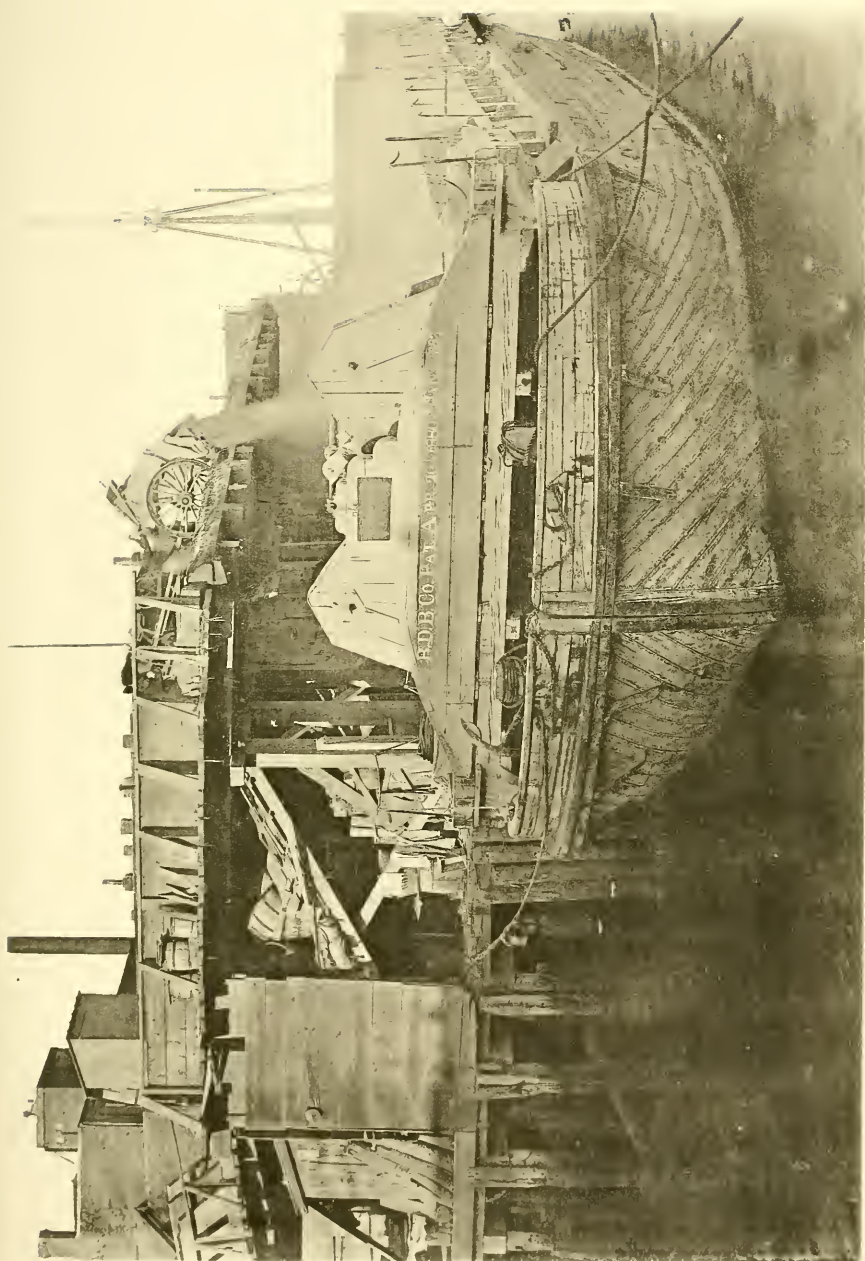
This circular read as follows :

STREET DEPARTMENT,
CITY HALL, BOSTON.

DEAR SIR: Under the Revised Ordinances of 1892 the Street Department of the city of Boston is not obliged to remove rubbish and dirt from stores and places of business. As it has been the practice of the department, however, for a number of years, to remove a certain amount of this material, arrangements have been made to continue to remove a limited quantity of non-combustible material each week. It is found that many storekeepers put out large quantities of light, bulky material, such as paper boxes, pasteboard, dry straw, etc., etc., which could readily be burned on the premises or elsewhere.

Since the city is under no obligation to remove such rubbish, you are hereby notified that such combustible material will in future have to be removed or disposed of by you.

Yours truly,
H. H. CARTER,
Superintendent of Streets.



DUMPING SCOW, LOADING.

There are still many firms that fail to realize their responsibility in the matter, who show great reluctance to incur any expense in carting away the waste productions of their own business.

The ordinances do not include such waste in defining the duties of the Street Department, and for this cause, under a fair construction of the ordinances, the custom and practice in vogue for years has not been wholly discontinued, but limited, practically, to the removal of a reasonable portion of the legitimate sweepings of the floor.

THE TOW-BOAT "CORMORANT."

A considerable reduction of expense in towing waste material to sea has been effected by the building of a powerful tow-boat for this purpose. In former years the bills for hired tow-boats amounted to about \$8,000 per year, and as the department was under the expense of also maintaining a small unseaworthy tow-boat, the building of a new boat, capable of doing all the work of the department, will result in an annual saving of this amount.

The new tow-boat "Cormorant," adapted to the work of the Sewer and Sanitary Divisions, which was under construction at the time last year's report was issued, was accepted by the department April 11, 1893. The boat was launched February 7, 1893, and the trial trip was made on April 7. It was built at the Atlantic Works, East Boston.

The hull was designed by John H. Dahl, N.A., and the engines by James T. Boyd, M.E. ✓

The work done by the boat is the towing of the sludge scows of the Sewer Division and the garbage scows of the Sanitary Division. In view of the fact that tows have to be made regardless of the weather, and that in the winter season the bay about the Pumping-station is liable to be frozen over, the designers were informed that there were three primary qualities that the boat must possess; namely, stability, power, and ability to break ice. The result of their work, as well as that of the builders, has proved that the boat not only has the required qualities, but is also a fine-looking boat and a credit to the designers, as well as the department.

The following are some of the principal dimensions, etc.:

Length from outside of stem to outside of guard at stern, 93 feet 8 inches; breadth of beam, 20 feet; draft, 9 feet.

The keel, steam-propeller post, shaft-log, deadwood, and planking are all white oak, the latter being $2\frac{1}{2}$ inches thick.

As a protection when breaking ice the sides are coppered

with 40-ounce copper from the under side of lower guard, to 18 inches below water-line.

The engine is an inverted, compound, high-pressure cylinder 15-in. diameter; low-pressure cylinder, 28-in. diameter, and 20 inches stroke of piston.

Steam is supplied by a Scotch boiler 9 feet 6 inches in diameter and 11 feet long; working pressure, 110 lbs. per square inch.

Diameter of propeller wheel, 7 feet.

DUMPING-WHARF.

No action has been taken on the recommendation that a new dumping-wharf be procured at the North End. At the time this recommendation was made, there were several wharves available, which have since been bought by steamship companies, or condemned for the North End park.

The procuring of a suitable wharf will now be a matter of some difficulty, even if an appropriation is made.

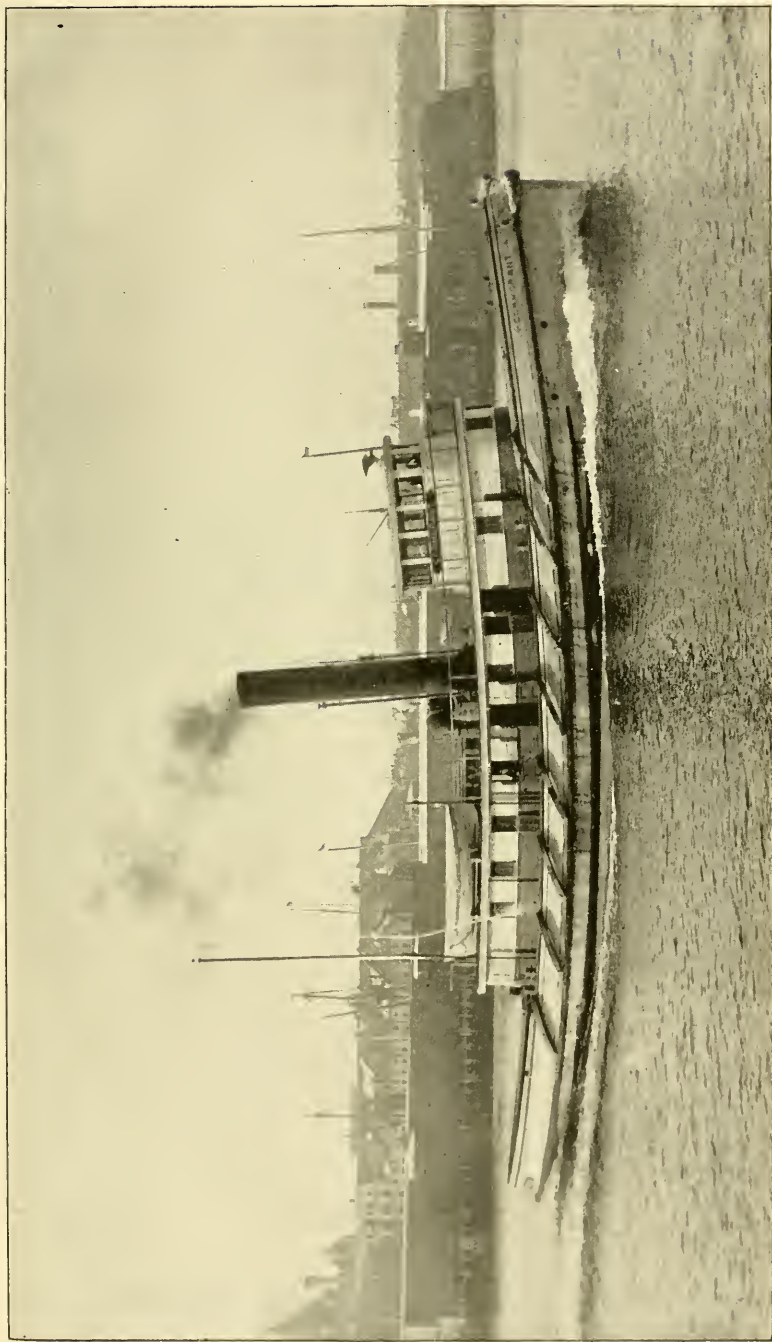
In July, 1892, an injunction was asked of the Superior Court by the Boston and Portsmouth Steamship Company, against the use of the Fort Hill wharf as a dumping-wharf, on the ground that it was a nuisance to the company and the passengers using its steamships running to the Isles of Shoals and Portsmouth from Snow's Arch wharf. After consideration of the testimony, the Court refused to grant the injunction, as it was shown that it was imperative for the city to maintain this wharf as a dumping-station. Grave doubts exist as to the Court's having the same opinion when it comes to a final hearing of the case.

The advisability of the department having another wharf is manifest, as it would be a very serious matter if, for any reason, the present wharf could not be used, even for a short time.

The refuse material which has been towed to sea and dumped during the year has been conveyed in the Barney dumping-scows in use by the city.

The recommendation made in last year's report, that the city purchase a second dumping-boat in place of leasing one, has not received consideration from the government.

Considering the fact that a new scow could be built for \$14,000, and that the city pays a rental of \$15 per day for the one it hires, the purchase of a scow would be a matter of economy.



THE STREET DEPARTMENT TOW-BOAT "CORMORANT."

SEWER DIVISION.

The Sewer Division has charge of the following work :

1. The maintenance and construction of all common sewers and catch-basins.
2. The maintenance of the Main Drainage Works.
3. The maintenance of Stony brook.
4. The maintenance and construction of all street culverts.
5. The preparation of plans, and the engineering and supervision required on the construction and maintenance of all work connected with the division.
6. The granting of permits for all connections to be made with the common sewers, and the custody of bonds filed by drain-layers authorized to make such connections.
7. The levying of assessments on estates benefited by the construction of sewers.

The general work of the year, with comments, may be outlined as follows :

Sixty-six thousand four hundred linear feet of sewers have been built during the past year by the city, and 22,837 feet have been built by private parties, according to the plans and rules of this division, and accepted by the city under the usual form of release.

Under Chap. 323 of the Acts of 1891, as amended by Chap. 402 of the Acts of 1892, the Board of Street Commissioners had laid out a number of streets, and this division has built, by contract, all the sewers, catch-basins, and house-drains which will ever be required, carrying the latter out to the curb-line. In the case of some unusually wide streets, a sewer has been built on each side of the street close to the curb, it having been found cheaper to do this than to build so many long house-drains. The object of building all these drains at one time is to make it feasible to preserve the street surface from the destructive effect of the constant digging of trenches for the laying of drains to connect the houses with the sewers.

The water and gas mains and house connections have been laid in these streets in the same manner and for the same reason.

The necessity of preserving and improving the natural

watercourses in the larger valleys of the suburban districts becomes more apparent every year, and is coming to be better understood by the citizens generally. On the peninsula which formed the original town of Boston there were no extensive valleys; the sewers were naturally designed to take all surface-water as well as house sewage proper, and this practice was naturally applied to the outlying districts when sewer-building began there; but there it was entirely inapplicable, on account of the enormous size of the valleys. For example, in the valley which includes the western third of Brighton, the main outlet sewer has been begun, being designed to take the house sewage of the future population together with a small quantity of surface-water from the streets (the first flow from a street being the dirtiest); this sewer is four feet in diameter. If the large brook now existing in this valley were to be obliterated and the sewer were required to take all the surface-water, it would have to be $7\frac{1}{2}$ ft. in diameter; the economy of preserving the existing watercourse is obvious.

In order to relieve to some extent the distress caused by the large number of men being out of employment during the winter, a number of sewers have been built, 13,878 feet in all, which would not ordinarily have been built in cold weather; these sewers have been partly paid for out of the fund contributed for the relief of the unemployed.

Although the work could not be prosecuted as economically as it could have been under more favorable weather conditions, it is believed that much relief has been afforded to the laboring class.

There are a number of large main sewers, for which the necessity has long been felt, but the building has been postponed from year to year, owing to their great cost and to the small proportion recoverable in the form of assessments; these should be begun at once, and the funds provided, as specified in Chapter 323 of the Acts of 1891, or else long-time loans should be negotiated for this purpose.

EAST BOSTON DISTRICT.

The sewer outlet under Morrison's wharf was nearly destroyed by ice last winter, and it is about to be rebuilt; a row of piles, to protect it from the ice, will be driven along the edge of the wharf.

The other outlets mentioned last year — Eagle square and Dock 13 outlets — should be extended, and Jeffries, Decatur, and Brooks street outlets should be rebuilt as soon as money can be obtained for this purpose.

The sewer in Havre street, between Meridian and Sumner, an old sewer, partly of wood and partly of brick and stone, is in very bad condition, and should be rebuilt.

The Metropolitan Intercepting Sewer is now being built in East Boston, and a number of connections may be built this year. If a connection is allowed at the corner of Orleans and Maverick streets, the damming up of the Orleans-street sewer, as described last year, may be remedied in that way ; but the necessity for a connection with the Porter-street outlet will remain, in order to convey the storm-water directly to that outlet.

The Porter-street outlet, a large wooden box sewer on piles, which was built in 1886, and has been exposed to the action of large masses of ice every winter, is becoming badly wrecked, and now fails to convey all the sewage to the extreme outlet, much of it leaking out and spreading over the flats enclosed by the sea-wall. It has been repeatedly repaired, but will soon have to be entirely rebuilt.

A new main sewer will have to be built shortly in Chelsea street, with storm overflow at the Chelsea-street bridge. This will afford an outlet for sewers in Chaucer, Pope, Curtis, and adjacent streets.

The sewer in Paris street, near Meridian street, which drains through Wesley street, will have to be rebuilt.

Work is about to be commenced on the outlet sewer for Leyden street, west of Breed street.

The Board of Metropolitan Sewerage Commission, not having completed the siphon under Belle Isle Inlet, no arrangement could be made to take the sewage of Orient Heights into the Metropolitan sewer, as proposed in last year's report.

Work done during 1893.

Two thousand three hundred and ninety-five linear feet of sewers were built last year, including the completion of the Moore-street and Lamson-street outlets to deep water.

CHARLESTOWN DISTRICT.

In the Alford-street district the sewer in Alford street has been built, and now discharges temporarily into the Mystic river at the bridge, and will continue to so discharge until it is possible to connect it with the Metropolitan sewer. The sewers in the rest of the streets of this district will all (with the exception of West street) drain through a sewer to be built in Arlington avenue ; it is not advisable to build this sewer until after the Somerville branch of the Metropolitan

sewer, which is designed to go in the same avenue, has been built; this will probably be done this year, after which the sewerage of this district may be completed.

Work done during 1893.

Two thousand three hundred and thirty-four linear feet of sewers, all 12 and 15 inch pipe, were built last year.

CITY PROPER AND BACK BAY DISTRICTS.

Owing to the uncertainty in regard to the proposed building of a subway to the abandoned site of the Boston and Maine station in Haymarket square, the route of which would cut across the line of the proposed sewer for the relief of the Canal-street district, it has not been thought expedient to make a beginning on this sewer.

If such a subway is built, the sewer systems of this vicinity will all have to be remodelled, and lines and grades adopted, which will not interfere with the subway.

The sewer in Hull street, although it continues to perform its office, should be rebuilt, as it is liable to fall in.

No sewer has been built yet to take the sewage of the houses on the water side of Beacon street. If a boulevard or parkway is to be built there, the sewer should be built in connection with it.

Nothing has yet been done to improve the sanitary condition of the Faneuil Hall markets; when a new sewer is built across the city, to relieve the Canal-street system, the markets can be satisfactorily sewered.

An overflow sewer, to connect with the Muddy-river conduit, is an essential part of the system of sewers of which the sewer in Vila street is the main; this is not yet built, but will have to be, before many sewers receiving surface-water can be added to this system.

Work done during 1893.

One thousand five hundred and one linear feet of sewers were built by the city, and none by private parties.

SOUTH BOSTON.

There is little to be said about the sewers in South Boston which has not been said in previous reports; in general, there are many defective sewers, which will have to be rebuilt from time to time, and there is need of a capacious outlet to the South Bay, for the sewer systems of the southwestern part of the peninsula.

The sewer outlets on the southerly side of the peninsula at N, K, I, and H streets are all stopped up, and the sewage discharges upon the beach. These will have to be rebuilt, and extended to low-water mark ; but the work had better be deferred until some of the filling has been deposited to form the new proposed Park boulevard.

Work done during 1893.

Six hundred and ninety-four linear feet of sewers were built by the city, and 475 by private parties.

DORCHESTER DISTRICT.

The Dorchester Lower Mills sewer is now nearly done, and the Dorchester intercepting sewer is also approaching completion, that is as far as Lower Mills ; and the time is now at hand when the whole of Dorchester Lower Mills village may be sewered. A petition for sewerage, signed by about 150 persons, was presented as long ago as 1887, and numerous other petitions have been received since.

The people of this district should be given the benefit of these two expensive sewers, aggregating in cost about \$200,000, at the earliest possible time ; to accomplish this, the pipe sewers in the various streets should be built at once in anticipation of the completion of the mains, so that all may be put into operation this year.

Sewers have been built in Sturbridge and Sanford streets during the past winter, in accordance with this idea, and have afforded labor to many of the unemployed, through the coöperation of this department with the Citizens' Relief Committee. The necessity for sewerage the "Corbett, Maxwell, and Capen street" district is as urgent as that of Dorchester Lower Mills.

A petition has been received asking to have the temporary pumping scheme, as proposed in last year's report, carried out ; and there does not seem to be any other feasible plan for affording immediate relief to this locality, as a sewer largely in tunnel, by the Park street or any other route, would require several years to build.

The portions of the system proposed which would have to be abandoned upon the completion of the tunnel sewer would cost but a small percentage of the whole, as most of the sewers would be of a permanent character.

The northern portion of the Savin Hill peninsula will have to be provided with a system of sewers very soon, as building is going on there quite rapidly, and the rocky character of the ground makes cesspools expensive and troublesome.

Work done during 1893.

Twelve thousand seven hundred and fifty linear feet of sewers were built by the city, and 8,606 feet by private parties.

ROXBURY.

There are, in Roxbury, many bad sewers, and in some places whole systems of sewers which are defective, and extensive rebuilding will have to be done at some time in the future. Most of it is of an expensive character, and is put off from year to year on that account.

In the City Proper and in South Boston a similar state of things exists. It would seem that the only practical way in which anything can be accomplished is to issue a long-time loan for the purpose of providing funds for rebuilding defective sewers in these districts.

Work done during 1893.

Twenty-two thousand one hundred and eighteen linear feet of sewers were built by the city, and 3,028 feet by private parties.

WEST ROXBURY.

Now that the Roslindale and West Roxbury Trunk sewer has been practically completed, at an expense of about \$150,000, advantage should be promptly taken of it to build tributary sewers in all streets on which there are many dwellings.

Work will be commenced very soon upon a branch of the main sewer which is to cross the railroad tracks at Highland Station, and connect with sewers already built by private parties. Upon the completion of this connection, the land owners on Park, Bellevue, and adjacent streets propose to combine and build quite an extensive system of sewers to be released to the city.

The land in the vicinity of South street, between Keyes and Morton streets, sometimes called the Anson and St. Mark street district, needs sewers badly; and the outlet sewer to Washington street must be built at once, before the operations of raising the grade of the Providence Railroad begin. A main sewer here would open up much valuable land for building purposes, near the village of Jamaica Plain.

Streets in the low lands near Stony brook in Jamaica Plain need sewers, but none can be built because the main sewer in Washington street is too high.

These streets cannot be properly sewered until a new main

sewer is built at a lower level, probably in the channel of Stony brook, as discussed in previous reports; drainage might be temporarily secured by some scheme of pumping. If a separate system were built in these streets, and surface and roof water rigidly excluded from the sewers, the amount of sewage to be pumped would be small.

Work done during 1893.

Twelve thousand three hundred and thirty-six linear feet of sewers have been built by the city, and 8,107 feet by private parties.

BRIGHTON.

A beginning has been made on a system of sewers for the western part of the town, as discussed in former reports, and the outlet sewer is now being built.

All the abattoir drains which are in operation have been connected with the Metropolitan sewer, and this source of pollution of the river has been done away with.

A large amount of sewer-building has been done on Commonwealth avenue, and everything in the nature of sewers, surface drains, and catch-basins between Beacon street and Brighton avenue will soon be completed, with the exception of the structures which are to be built at the marshy spot just west of Essex street, where the filling is not yet sufficiently well settled. The greater part of the work of the same nature between Brighton avenue and Warren street has also been completed.

Sewers are needed in North Harvard street and Western avenue, north-easterly from their junction. As previously explained, a separate system of sewers will have to be built in each of these streets, one sewer to convey surface-water to the river, and another sewer to convey house sewage to the Metropolitan sewer.

Work done during 1893.

Twelve thousand two hundred and seventy-three linear feet of sewers were built by the city, and 2,621 feet by private parties.

STONY BROOK.

The engineers of the New York, New Haven, & Hartford Railroad have included, as an essential part of the work of raising the railroad, the building of a new channel for Stony brook between a point near Amory street and a point about 400 feet south of Boylston street.

This proposition obviates most of the difficulties discussed

in former reports, as likely to ensue in consequence of the raising of the tracks.

By constant attention the water in the brook has been satisfactorily handled during the past winter, a sufficient quantity having been turned down the old channel to satisfy the Boston Belting Company, and the remainder having been turned into the new channel at the inlet chamber near Pynchon street. The flow of water into either channel is regulated by changing stop-planks in the various openings, controlling in this manner the flow of water in the old channel, and preventing flooding in Roxbury. Dams of ice and snow have formed occasionally, but have been removed before damage could result.

MAIN DRAINAGE WORKS.

This branch of the Sewer Division is in about the same general condition as when last year's report was issued. There has never been a time since these works were put in operation that a satisfactory report could be made in regard to them, for the reason that, while they are works that are unequalled in the country, and the original design has proved to be all that was expected, the plant was started in operation before it was completed, and there has been practically nothing done towards completing it since. Each successive year attention has been called to the incompleteness of different portions of the works and the need of completion stated, but the necessary appropriations for the work have never been furnished.

The conditions at the pumping-station this year over last show an increased amount of repairs needed to put the works in proper working condition. The refitting of the valve-seats on the pumps spoken of last year has been continued, so that three of the four pumps are now complete in this respect, and work on the fourth is in progress.

The failure to do any of the other work mentioned last year, in connection with the pumps even, has caused the amount of repairs now necessary to be greatly increased, as well as the cost of maintenance under the present conditions. The lack of money, either in the amount allowed for maintenance or by special appropriation, is the only thing that has prevented this costly plant from being kept in its proper and efficient condition. The most important items necessary at the pumping-station are: the refitting of the gates of the pump-wells, also those at the filth-hoist, and a new set of cages and chains at the latter place, new tubes for the four boilers, and a second main steam-pipe to the pumps. There



DISCHARGE OF OUT-FALL SEWER AT MOON ISLAND.

is a large loss of duty caused by leakage at the steam end of the pumps. The steam-pipes have been under constant pressure for ten years, and need to be thoroughly overhauled.

This cannot be done without an auxiliary main pipe, as the plant is never shut down, and proper repairs cannot be made while the pipes are under steam pressure of 100 lbs. per square inch.

The extension of the wharf and the dredging of the channel, spoken of in last year's report, have not been done, but the urgency for both is greater than ever. The usual tests of the tunnel, to ascertain the reduction of area, if any, from deposits, have been made, and its condition is very satisfactory. On account of complaints that the grease taken from the east shaft, towed to sea and dumped, was finding its way to the shores and beaches of the bay, this way of disposing of it was stopped. After trying to dispose of it in several different ways, a method of separating the grease from the other impurities has been found, so that now it is of some value, as the revenue from it will at least pay for the cost of its removal.

At Moon Island there is considerable needed in the way of repairs.

The work on the gates and frames in the discharge sewer has been completed. The same repairs are necessary on the outfall sewer gates. The walls of all the divisions of the reservoir need repointing, as does the brickwork of the southerly wall of the long gate-house. The gas from the sewage has a decided effect on mortar, — much more so than the sewage itself. The difference was shown very plainly in the outfall sewer, where the pointing was done last year. The mortar between the bricks above the surface of the sewage, was gone for an inch in depth, while that below the surface was intact.

A boat chamber should be built in the outfall sewer near the gate-house for convenience in entering the sewer, and for ventilation, of which there is great need. All of the iron fence around the reservoir will have to be repaired, as it is in a dangerous condition.

An iron balcony should be built on the front of the outfall building for the use and safety of the men on the work.

The turbine wheel will probably have to be renewed the coming year, as it is about destroyed.

INTERCEPTING CONNECTIONS.

All the Brighton sewers that emptied into the Charles river were, during the past season, connected with the ex-

tension of the Main Drainage Works constructed by the Metropolitan Sewerage Commission.

The main and intercepting sewers throughout the city have received more than the usual attention. The large number of new connections with the interceptors has greatly increased the work of the force having charge of this portion of the system, and the construction of proper buildings at its headquarters, spoken of in the last report, should not be longer delayed.

DYNAMITE.

The increasing use of dynamite in rock-blasting in this city has been accompanied by a number of accidental explosions. This peculiar explosive is safe enough if handled properly, but if not so handled is exceedingly dangerous. The principal source of danger arises from the necessity of warming it before using, in order to make it effective in cold weather. Various methods are resorted to: the cartridges are sometimes embedded in hot sand, they are sometimes warmed by being placed around a stove or on a shelf over the stove in the tool-house; quite a common practice is to warm them in one of the pine boxes in which they are packed by the dealers. If the same box is used for a considerable length of time, the wood becomes saturated with the nitro-glycerine oil which oozes slowly from the cartridges; the box then becomes a source of danger, being sensitive to concussion. After consultation with the manufacturers, a code of rules has been drawn up, which, if rigidly enforced, would render accidental explosions almost impossible. These rules are as follows:

RULES

For the use of Dynamite, Dualin, Forcite, and other Nitro-Glycerine Compounds.

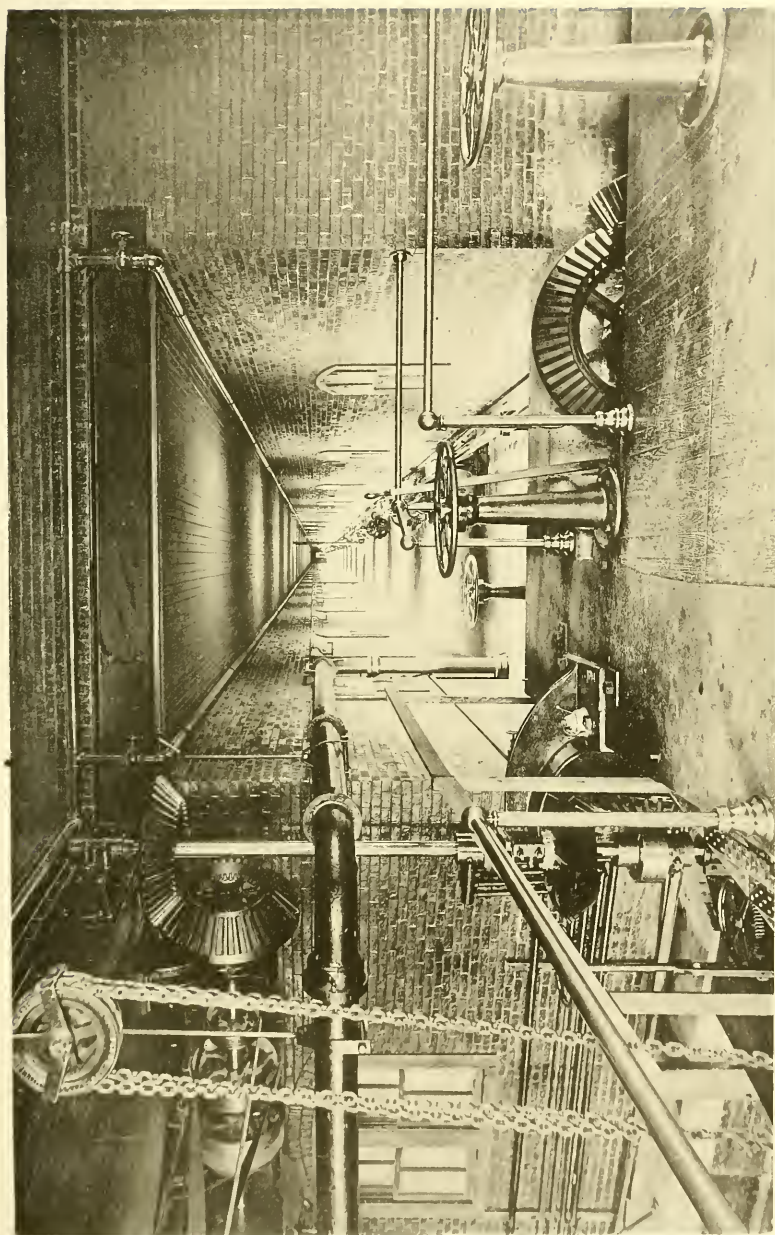
No quantity of dynamite or other similar explosive in excess of twenty pounds shall be kept in the immediate vicinity of the work.

Any larger amount shall be stored in a locked shed or box at a distance of two hundred feet or more from the trench.

Exploders shall not be kept in same shed, box, or other enclosure with dynamite. Exploders shall not be put into the cartridges until the moment of loading the holes. Cartridges with exploders attached shall not be carried about the work.

In case four or more cartridges are loaded into one hole, a common fuse cap shall be inserted into the cartridge which lies upon the one at the bottom of the hole, more than usual care being exercised to ram gently this cartridge and those above it.

When cold weather makes it necessary to warm the cartridges, the warming shall be done in the following manner: Water shall be heated to the boiling point in an iron pot (to be furnished by the city for that purpose), and a sufficient quantity of hot water shall be poured into the space between the inner and outer walls of a galvanized iron



GATE-HOUSE, SHOWING SIX-FOOT GALLERY — MOON ISLAND.

Length, 600 Feet.

warming pail (to be furnished by the city) to fill that space; the cartridges are then to be placed in the inner pail to warm.

The water is to be boiled in a separate pot as directed; the galvanized iron pail is not to be put over the fire.

The cartridges are to be carried to the holes which are to be loaded in this double pail, the space between the inner and outer pails being kept filled with hot water, and the pail covered with the cover.

If the cartridges have to be carried a long distance, the first water used may be thrown out, after the cartridges are thawed, and the space filled again with hot water.

The cartridges shall not be removed from the inner pail except at the hole to be loaded; they shall then be primed by attaching the exploders, and shall then be immediately loaded into the holes.

Cartridges shall not be warmed in any other receptacle or in any other manner than has been directed; foremen shall be responsible for the rigid enforcement of these rules on their work; and inspectors shall require the same rules to be rigidly enforced by contractors both upon work under contract to the city, and on sewers which are being built by private parties to be released to the city.

Contractors will be furnished by the city with the proper appliances.

These rules can be enforced by this department only on work over which it has supervision, but much rock-work is done by the contractors, frequently close to travelled streets, where such supervision cannot be exercised.

The safety of the general public demands that the City Council should compel, by ordinance, the observance by contractors of these or a similar set of rules; permits should be required for this kind of work, and the city should send properly instructed inspectors to enforce such rules rigidly.

DIAGRAMS.

The diagrams for sewer calculations, published in last year's report, are again inserted. These diagrams are used to determine approximately and very readily the size which a sewer should have, when the conditions of slope and character of the surface of the area to be drained and the slope of the sewer are known.

Plate 1 is intended to show the maximum rate of flood discharge which it is reasonable to provide for from a given area of a certain degree of steepness, according to the Buerkli-Ziegler formula, using for the factor R the value 1; *i.e.*, one cubic foot per second per acre or its equivalent, one inch of rain per hour.

Plate 2 shows the discharging capacity of sewers of a given size at a given inclination.

Each curve represents two sets of values, one for a sewer of a certain size running full, and another for a sewer of a larger size running at approximately three-fourths full.

LAWS AND ORDINANCES CONCERNING THE BUILDING AND
ASSESSING OF SEWERS.

The following complete compilation of the various laws and ordinances under which sewers have been built in the city of Boston has been made for convenient reference.

PROVINCE LAWS, 1709-10.

Act, Passed at the Session begun and held at Boston, October 26, 1709.

(Chapter 5.)

AN ACT FOR REGULATING OF DRAINS AND COMMON SHORES.*

For preventing of inconveniences and damages by frequent breaking up the highways, streets, and lanes, in towns, for the laying and repairing of drains, or common shores, and of differences arising among partners in such drains, or common shores, about their proportion of the charge for making or repairing the same,

Be it enacted by His Excellency the Governor, Council, and Representatives in General Court assembled, and by the authority of the same.

SECTION 1. That from and after the 25th day of March, 1710, no person may presume to dig or break up the ground, in any highway, street, or lane, within any town, for the laying, repairing, or amending of any drain, or common shore, without the approbation and consent of the selectmen, signified in writing under the hand of the town clerk, on pain of forfeiting twenty shillings to the use of the poor of such town, to be levied by warrant from any one of her majesty's justices of the peace, and to make good all damages occasioned by such breach.

And be it further enacted,

SECT. 2. That all drains and common shores for the draining of cellars, hereafter to be made or repaired in any streets or highways shall be substantially done with brick or stock, in such manner as the selectmen of the town shall direct.

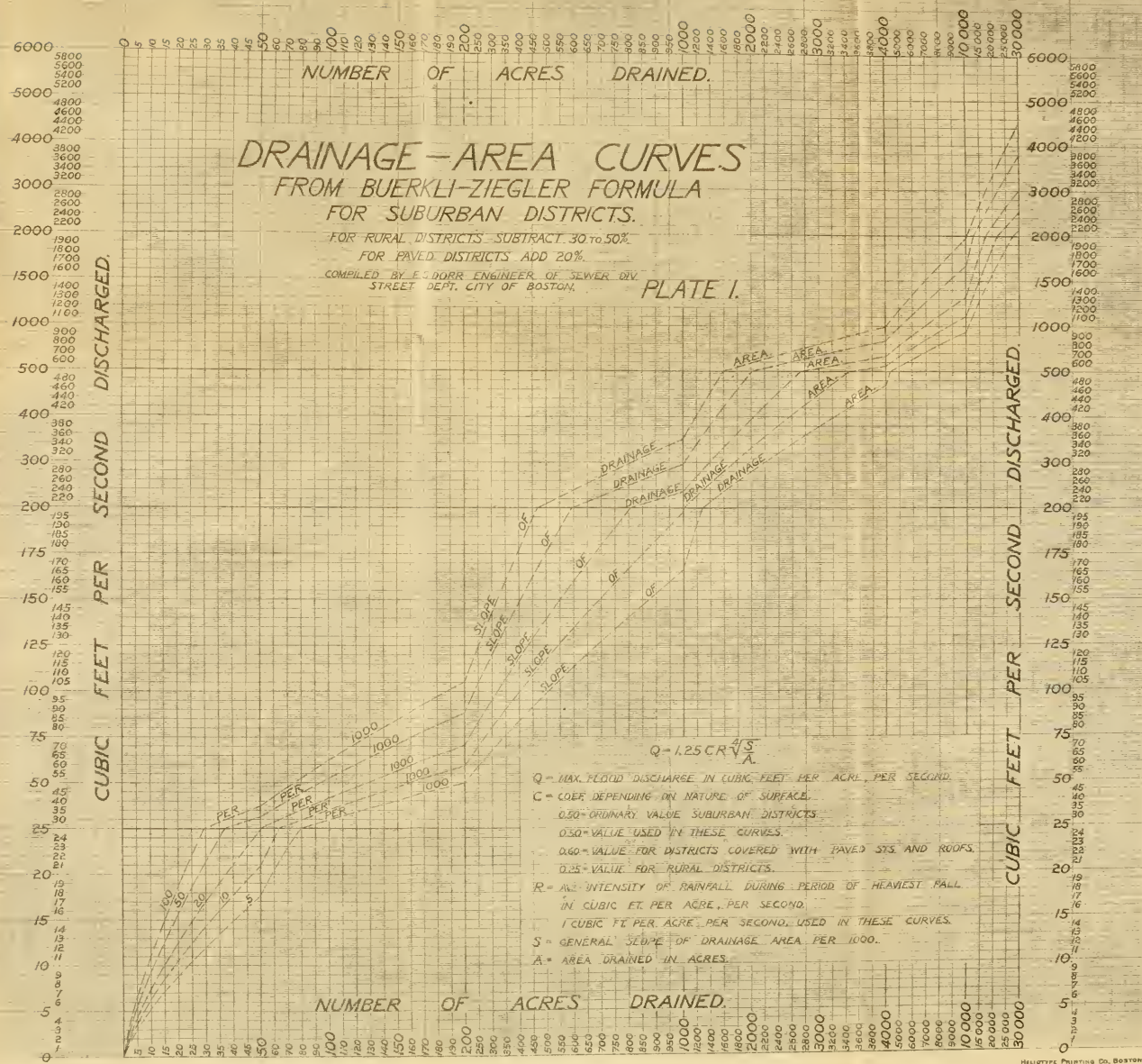
SECT. 3. And that it shall and may be lawful to and for any one or more of the inhabitants of any town, at his or their own cost and charge, to make and lay a common shore, or main drain, for the benefit of themselves and others that shall think fit to join therein.

And every person that shall afterwards enter his or her particular drain into such common shore, or main drain, or by any more remote means receive benefit thereby, for the draining of their cellars or lands, shall be obliged to pay unto the owner or owners of such common shore or main drain, a proportionable part of the charge of making or repairing the same, or so much thereof as shall be below the place where any particular drain joins or enters thereinto, at the judgement of the selectmen of the town, or major part of them; saving a right of appeal to such determination; provided,

SECT. 4. This act shall not extend to the altering of any particular agreement, or contract made betwixt persons interested in any drain or common shore.

Passed Nov. 17.

* Sewers.



PROVINCE LAWS, 1762-63. CHAPTER 27.

An Act in addition to the act made and passed in the Eighth Year of the Reign of Her Majesty Queen Anne, Intituled "An Act for regulating of Drains or Common Shores."

Whereas, in and by an act made and passed in the eighth year of the reign of her late majesty Queen Anne, intituled "An act for regulating of drains and common shores," it is enacted, among other things "that it shall and may be lawfull to and for any one or more of the inhabitants of any town, at his and their own cost and charge, to make and lay a common shore, or main drain, for the benefit of themselves and others that shall think fit to join therein; and every person that shall afterwards enter his or her particular drain into such common shore, or main drain, or by any more remote means receive benefit thereby, for the draining of their cellars or lands, shall be obliged to pay unto the owner or owners of such common shore, or main drain, a proportionable part of the charge of making or repairing the same, or so much thereof as shall be below the place where any particular drain joins or enters thereinto, at the judgment of the selectmen of the town, or major part of them;" and whereas it frequently happens that the main drains, or common shores, decay and fill up, and the persons immediately affected thereby are obliged to repair such common shore to prevent damage to themselves and others whose drains enter above, as well as below, them, and no particular provision is made by said Act to compell such persons as dwell above that part where common shores are repaired, and have not sustained damage, to pay their proportionable share thereof, as shall be adjudged by the selectmen, nor in what manner the same shall be recovered, which has already occasioned many disputes and controversies; wherefore, for preventing the same for the future,

Be it enacted by the Governor, Council and House of Representatives,

SECTION 1. That whensoever it shall hereafter happen, after the 2d of April next, that any common shore, or main drain, is stopped or gone to decay, so that it will be necessary to open such common shore, or main drain, to remove such stoppage, and repair it; not only the person or persons who shall so do, or cause the same to be done, but all others whose drains enter, either above or below, such common shore, or main drain, or receive any benefit by said common shore or main drain, shall pay such a proportionable part of the whole expense of opening and repairing the common shore, or main drain, as shall be adjudged to them by the selectmen to the town or the major part of them to be certified under their hands; if any person or persons, after such certificate is made, shall refuse to pay the same within ten days, to the person so appointed by the selectmen to receive it, being duly notified thereof, he shall be liable and subject to pay to such person appointed, double the sum mentioned in such certificate, and all costs arising upon such refusal; and such person is hereby fully authorized and empowered to bring an action or actions for the same accordingly.

Provided always,

SECT. 2. That the persons who have occasion to open any common shore, or main drain, in order to clean or repair the same, shall first notify all persons who are interested therein, that they may have an opportunity of making their objections against such persons proceeding, and laying the same before the selectmen; and if the selectmen, or major part of them, judge their objections reasonable, then such person or persons shall not be obliged to pay any part of the charge thereof; but if they do not make their objections in person, or writing, within three days after warning given, or the selectmen, or the major part of them, determine their objection not of sufficient force, then such person or persons may (having first liberty therefor, under

the hands of the major part of the selectmen) proceed to open such common shore, and clean and repair the same; and all interested in such common shore, or main drain, shall pay their proportion as is provided in this act.

Provided also

SECT. 3. That nothing in this act shall be construed or understood to set aside or make void any covenants or agreements already made, or that hereafter may be made, among proprietors of such drains or common shore.

SECT. 4 This act to continue and be in force from the last day of March next, to the 2d of April 1770, and no longer.

Passed February 24, 1763.

1769-70.

AN ACT FOR REVIVING AND CONTINUING SUNDRY LAWS THAT ARE EXPIRED AND NEAR EXPIRING.

(Here follows among other acts)

An Act made and passed in the 8th year of her late Majesty Queen Anne, intitled "An act for regulating drains and common shores."

(As before printed.)

That such of the before mentioned acts as are expired, be revived and such of said acts as are not yet expired, be continued, with all and every clause, matter and thing therein respectively contained, and shall be in force untill the 1st of July 1773 and no longer.

Passed April 26th 1770.

Revived and continued in 1773 until November 1778.

Continued in 1778 until 1782.

Continued until 1797.

CHAPTER 14.

An Act for regulating Drains and Common Shores.

SECTION 1. Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same.

That if any person shall dig or break up the ground in any highway, street or lane in any town, for the laying altering, repairing or amending of any drain or common shore, without the consent of the Selectmen of the town, signified in writing under the hand of the town clerk, such person shall forfeit and pay four dollars for each offence, to the use of the poor of the town, to be recovered with costs of suit in action of debt by the Treasurer thereof, before any disinterested Justice of the Peace in the county.

SECT. 2. Be it further enacted, that all drains and common shores for the draining of cellars, which shall hereafter be made or repaired in any street or highway, shall be substantially done with brick or stone, or with such other materials as the Selectmen of the town shall permit, and in such manner as said Selectmen shall direct.

And when any one or more of the inhabitants of any town shall, by the consent, and under the direction aforesaid, at his or their own charge, make and lay any common Shore or main drain for the benefit of themselves and others, who may think fit to join therein, every person who afterwards shall enter his or her particular drain into the same, or by any more remote means shall receive any benefit thereby, for the draining of their cellars or lands, shall be held to pay to the owner or owners of such common Shore or Main Drain, a proportionable part of the charge of making or repairing the same, to be ascertained and determined by the Selectmen of the town, or a major part of them, and certified under their hands, saving always to the party

LENGTH OF SEWER FOR FALL OF ONE FOOT

$$Q = VA$$

Q = DISCHARGE IN CUBIC FEET
PER SECOND

V = MEAN VELOCITY IN FEET
PER SECOND

A = AREA OF CROSS SECTION OF STREAM

SEWER DIAGRAM

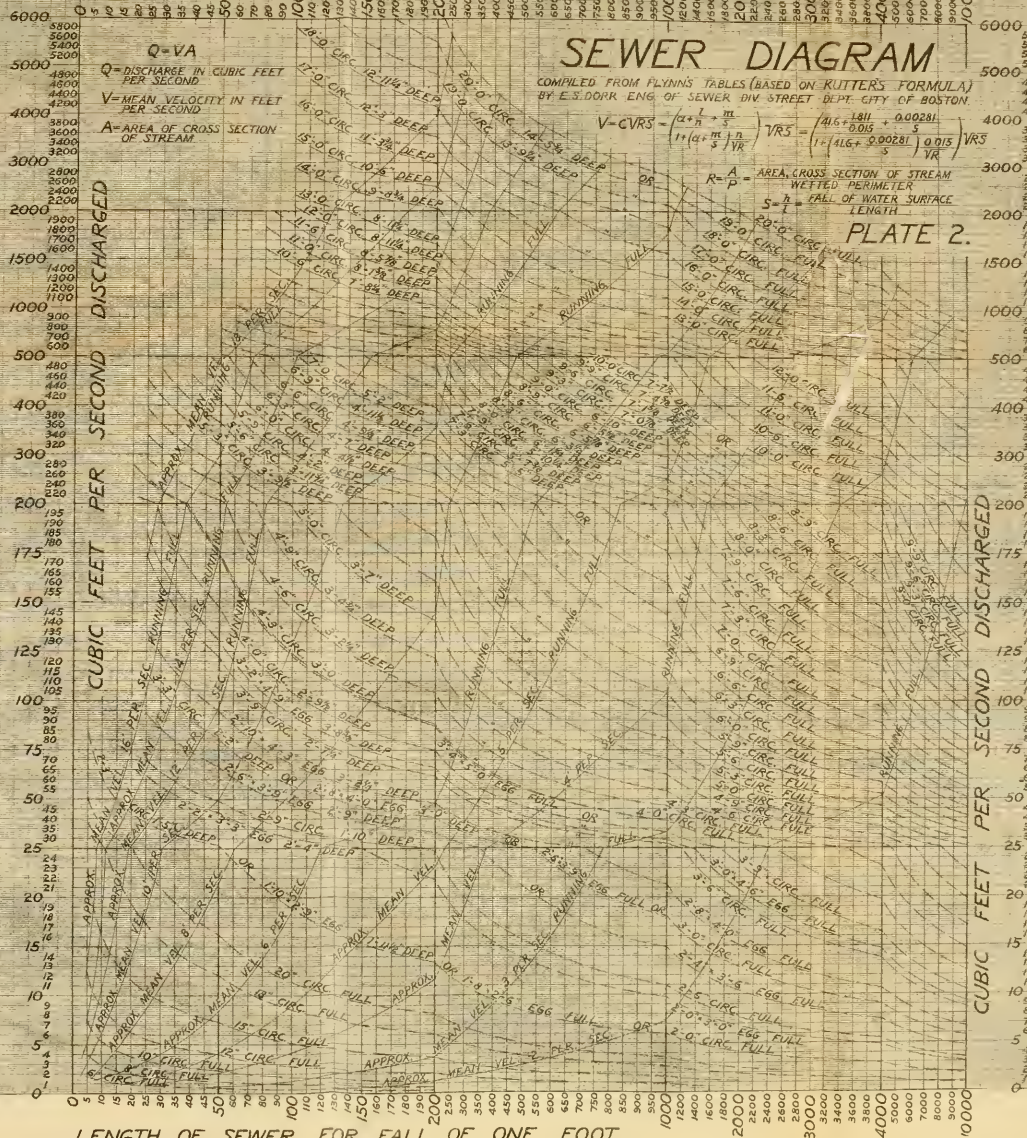
COMPILED FROM FLYNN'S TABLES (BASED ON KUTTER'S FORMULA)
BY E. S. DORR, ENG. OF SEWER DIV. STREET DEPT. CITY OF BOSTON.

$$V = CVRS = \left(\alpha + \frac{1}{n} + \frac{m}{s} \right) VRS = \left(\frac{41.6 + \frac{1.811}{0.015} + \frac{0.00281}{s}}{1 + \left(\frac{41.6 + \frac{0.00281}{s}}{s} \right) \frac{0.015}{VR}} \right) VR$$

$$R = \frac{A}{P} = \frac{\text{AREA, CROSS SECTION OF STREAM}}{\text{WETTED PERIMETER}}$$

$$S = \frac{h}{L} = \frac{\text{FALL OF WATER SURFACE}}{\text{LENGTH}}$$

PLATE 2.



LENGTH OF SEWER FOR FALL OF ONE FOOT

aggrieved at any such determination, a right to appeal to the court of General Sessions of the Peace.

SECT. 3. Be it further enacted,

That when any common Shore or main drain shall be stopped or gone to decay, so that it shall be necessary to open the same in order to repair it or remove such stoppage, all the persons who shall be benefited by such repairs or removal of obstructions, shall be held to pay their proportionable part of the expenses thereof, as well as those who do not as those who do cause such repairs to be made or obstruction removed; to be ascertained and determined by the Selectmen as aforesaid, having an appeal as aforesaid.

And each person so held to pay his or her part shall have notice thereof, of the sum, and to whom to be paid; and if such person shall not pay the same within 10 days after such notice, to the person appointed by the Selectmen to receive it he or she shall be held to pay the person so appointed, double the sum mentioned in such certificate, with all costs, arising upon such neglect; and such person is hereby empowered to bring an action or actions for the same accordingly.

Provided always, That the person or persons who shall have occasion to open any common shore or main drain, in order to clear and repair the same, shall, seven days at least before they begin to open the same, notify all persons interested therein, by advertising in such manner as the Selectmen may direct, that they may (if they think proper) object thereto, and lay their objections in person or writing before the Selectmen; and if the Selectmen or the major part of them, shall judge the objections reasonable, then the person or persons making the same shall not be held to pay any part of such expenses, but if they do not make their objections as aforesaid to the Selectmen within 3 days after being so notified, or if they shall deem the objections not to be sufficient, then they shall under their hands give liberty to the persons applying to proceed to open such common Shore or main Drain and clean and repair the same; and all interested therein shall pay their proportions as is provided in this act.

Provided also, That nothing in this act shall be understood or construed to effect or make void any covenants or agreements already made or that may hereafter be made, among the Proprietors of such Drains or common Shores.

SECT. 4. Be it further enacted, That this act shall take effect and be in force on and after the 1st day of July next and that an act passed 1709 for regulating drains and common Shores and another act passed 1763 in addition thereto and continued in force to the 1st of November next, be repealed on and after the 1st day of July except as to the enforcing payment of such forfeitures as may before that time accrue by virtue thereof.

Passed Feb. 20th, 1797.

The laws passed from 1709 to 1797 provided for the building of individual drains and sewers by the inhabitants, the only restriction being that the materials entering into the work, and the proportionate part of the cost that persons should pay for the privilege of connecting with the sewer, should be determined by the selectmen.

*City Ordinance relative to Drains and Common Sewers, passed
July 7, 1823.*

SECTION 1. Be it ordained by the Mayor, Aldermen, and Common Council of the City of Boston, in City Council assembled, That all com-

mon sewers which shall hereafter be considered necessary by the mayor and aldermen, in any street or highway in which there is at present no common sewer, shall be made and laid, and forever afterward shall be kept in repair, at the expense of the city and under the direction of the mayor and aldermen, or of some person or persons by them appointed.

SECT. 2. Be it further ordained, That every person who shall enter his or her particular drain into such common sewer, or shall otherwise be benefited thereby, shall be held to pay the city such sum of money as the mayor and aldermen shall deem just and reasonable, having reference always to the valuation of each estate connected with said drains, in the assessors' books; and in the case of any subsequent repair of such common sewer the mayor and aldermen shall assess the amount of such repair on those whose particular drains connect therewith, or are otherwise benefited thereby, in such amount as they deem just and reasonable.

SECT. 7. Be it further ordained, That whenever any common sewer shall go to decay, and the mayor and aldermen shall deem it necessary to rebuild or repair the same, they shall have power to cause the same to be done under their direction, and to assess the amount of such rebuilding or repairs upon the owner, agent, or tenant, as in the foregoing ordinance provided for the case of streets in which there is no common sewer.

This ordinance provided that sewers should be built by the city instead of by the individual, and that the expense of the work should be defrayed by the persons who connected with the sewer in such sums as determined by the Mayor and Aldermen.

City Ordinance relative to Sewers and Drains, passed February 13, 1834.

This ordinance is almost identical with the Ordinance of 1823, with the exception that the superintendence of all sewers was put into the hands of the City Marshal. As the Ordinance of 1823 was very ambiguous concerning sewer assessments, the Ordinance of 1834 contained the following clauses relative to this matter:

SECTION 4. Be it further ordained, That it shall be the duty of the auditor of accounts to keep an accurate account of the expense of constructing each common sewer, and on receiving the report of the city marshal relating thereto, to assess the expense upon the persons and estates deriving benefit therefrom, in conformity with the provisions of this ordinance and the laws of the Commonwealth; and after having completed such assessment, he shall report the same to the mayor and aldermen, and if sanctioned by them he shall enter the same in books to be kept for that purpose, and proceed forthwith to collect such assessments.

It would also seem that under the Ordinance of 1823 some difficulty had arisen concerning the levying of assessments, as section 5 of the Ordinance of 1834 provides for the collection of back assessments, as follows:

SECTION 5. Be it further ordained, That for the purpose of making and collecting assessments for common sewers heretofore constructed by the city, the expenses of which have not already been assessed and collected, it shall be the duty of the city marshal and the auditor of accounts to proceed in relation to all such sewers in the same manner as they are by this ordinance directed to proceed in relation to those which may hereafter be constructed.

*An Ordinance to establish the Office of Superintendent of Sewers.
June 6, 1837.*

SECTION 1. There shall be appointed annually in the month of May or June, by concurrent vote of the city council, a superintendent of common sewers.

SECT. 3. The said Superintendent, whenever any common sewer is ordered to be built or repaired, shall ascertain its depth, breadth, mode of construction, and general direction, and make a plan thereof, and insert the same, with all those particulars, in a book to be kept for that purpose, and forthwith ascertain and insert on said plan all entries made into such sewer, and obtain from the assessors' book the valuation of all estates which shall be benefited thereby.

SECT. 4. The said Superintendent shall keep an account of the expense of constructing each common sewer, and assess the expense upon the persons and estates deriving benefit therefrom; and after having completed said assessment he shall report the same to the mayor and aldermen, and if sanctioned by them, he shall enter the same in books to be kept for that purpose, and shall forthwith make out bills for the said assessments against all persons whose drains have entered the common sewer, or who have been otherwise benefited thereby, and deliver the same to the city treasurer for collection; and the said treasurer shall forthwith present the same for payment; and all bills or dues under this ordinance which shall remain unpaid at the expiration of sixty days shall be handed to the city solicitor, and forthwith be put in suit.

SECT. 5. The said Superintendent shall proceed forthwith to make all assessments for common sewers heretofore constructed by the city, the expenses of which have not already been assessed and collected, in the same manner as he is by this ordinance directed to proceed in relation to those which may hereafter be constructed.

The above ordinance comprises, in a condensed form, all the provisions of former statutes and ordinances.

*An Act in relation to Main Drains or Common Sewers. Passed 1841.
Accepted by the City Council April 7, 1841.*

The only new feature introduced by this act is the clause relative to the sewer assessment, and the clause under which the city of Boston assumed one-quarter of the expense of construction, which is as follows :

And all assessments so made shall constitute a lien on the real estate assessed for one year after they are laid, and may, together with all incidental costs and expenses, be levied by sale thereof if the assessment is not paid within three months after a written demand of payment made, either upon the person assessed or upon any person occupying the estate, such sale to be conducted in like manner as sales for the non-payment of taxes.

SECT. 4. Any person who may deem himself aggrieved by any such assessment may, at any time within three months from receiving notice thereof, appeal to the county commissioners, or if the case arise in the city of Boston . . . to the court of common pleas; . . . *provided, however*, that in all cases of appeal as aforesaid, the appellant, before entering it, shall give one month's notice in writing to . . . mayor and aldermen of his intention to appeal and shall therein particularly specify the points of his objection to the assessment made by them, to which specification he shall be confined upon the hearing of the appeal.

SECT. 5. . . . and in the city of Boston not less than one-quarter part of such expense [of constructing, maintaining, and repairing main drains or common sewers] shall be paid by said city, and shall not be charged upon those using the said main drains or common sewers.

Ordinance passed June 14, 1841.

This ordinance is drawn in conformity with the act passed April 7, 1841, and contains no new features.

Ordinance passed December 31, 1862.

No owner or owners of any real estate, to whom permission has been or shall be given to construct private drains for such estate, shall by the construction of such private drains be exempted from an assessment lawfully imposed for constructing common sewers in the same vicinity.

STATUTES AND ORDINANCES IN FORCE 1869.

Statutes.

SECTION 4. Every person who enters his particular drain into such main drain or common sewer, or who, by more remote means, receives benefit thereby, for the draining his cellar or land, shall pay to the city or town a proportional part of the charge of making and repairing the same, to be ascertained, assessed, and certified by the mayor and aldermen or selectmen, and notice thereof shall be given to the party to be charged, or his tenant or lessee.

SECT. 5. Assessments so made shall constitute a lien on the real estates assessed for one year after they are laid, and may, together with incidental costs and expenses, be levied by sale thereof, if the assessment is not paid within three months after a written demand for payment, made either upon the person assessed, or upon any person occupying the estate; such sale to be conducted in like manner as sales for the non-payment of taxes.

SECT. 6. A person aggrieved by such assessment may, at any time within three months from receiving notice thereof, apply for a jury. Such application shall be made in like manner, and the proceedings thereon shall be the same, as in case of lands taken for laying out of highways; *provided*, that before making his application the party shall give one month's notice in writing to the selectmen or mayor and aldermen of his intention so to apply, and shall therein particularly specify his objections to the assessment made by them; to which specification he shall be confined upon the hearing by the jury.

SECT 7. . . . and in the city of Boston not less than one-quarter part of such expense [of constructing, maintaining, and repairing main drains and common sewers] shall be paid by the city, and shall not be charged upon those using the main drains and common sewers.

Ordinances.

SECTION 5. He [superintendent of sewers] shall keep an accurate account of the expense of constructing and repairing each common sewer, and shall report the same to the board of aldermen, together with a list of the persons and estates deriving benefit therefrom, and an estimate of the value of the lands upon which said expense ought to be assessed, exclusive of any buildings or improvements thereon.

SECT. 6. The board of aldermen, in making assessments for defraying the expense of constructing or repairing common sewers pursuant to the provisions of this ordinance, shall deduct therefrom such part, not less than one-quarter, as they may deem expedient, to be charged to and paid by the city; and they shall assess the remainder thereof upon the persons and estates deriving benefit from such common sewer, either by the entry of their particular drains, or by any more remote means, apportioning the assessment according to the value of the lands thus benefited, exclusive of any buildings or improvements thereon; and they shall also fix the time when the proportion of the assessments charged upon persons benefited shall be paid.

SECT. 7. The superintendent shall enter in books kept for that purpose all such assessments made by the board of aldermen, and shall forthwith make out bills for the same and deliver them to the city treasurer for collection; and the city treasurer shall forthwith demand payment in writing of the said bills, in the manner prescribed by law; and if any bills or dues under this ordinance remain unpaid at the expiration of three months after demand for payment or collection, the city treasurer shall cause the same to be collected by the proper legal process.

SECT. 9. It shall be lawful for all persons, having the care of any buildings, to carry the rain water from the roofs of said buildings, at their own expense, into any common sewers, free of any charge from the city; *provided, however*, that the same be done by tight water spouts and tubes under ground, and under the direction of the board of aldermen.

SECT. 14. No owner or owners of any real estate to whom permission has been or shall be given to construct private drains for such estate shall, by the construction of such private drains, be exempted from an assessment lawfully imposed for constructing common sewers in the same vicinity.

An Ordinance to amend an Ordinance in relation to Common Sewers and Drains. Passed July, 1875.

Be it ordained by the Aldermen and Common Council of the City of Boston, in City Council assembled, as follows:

SECTION 1. The ordinance in relation to common sewers and drains is hereby amended by striking out, in the twelfth line of the sixth section, the word "value," and inserting in place thereof the word "area;" also by striking out, in the thirteenth and fourteenth lines of said section, the words "exclusive of any buildings or improvements thereon."

An Act to establish the Office of Collector of Taxes. Passed May 3, 1875.

SECT. 2. Said collector shall have the powers now possessed by the treasurer of said city as collector of taxes, and shall also collect and receive all assessments. . . .

Acts and Resolves passed by the General Court of Massachusetts, 1878.
(Chapter 232.)

Be it enacted, etc., as follows:

SECTION 1. Section 4 of chapter 48 of the Statutes of 1869 of the General Statutes is hereby amended by inserting before the words "to

be ascertained" the words "and of the charge, not already assessed, of making and repairing other main drains or common sewers through which the same discharges."

SECT. 3. The city council of any city . . . may adopt a system of sewerage to apply to any part or the whole of the territory of such city . . . and may provide that the assessment authorized by section four shall be made upon the owners of the estates embraced in such system, by a fixed uniform rate, based upon the estimated average cost of all the sewers therein, according to the number of feet of area their said estates contain within a fixed depth from such street or way, or both, according to such frontage and area, which rate when adopted shall not be changed.

Approved May 8, 1878.

Section 1 above mentioned makes a radical change in the method of assessing the cost of sewers, inasmuch as it prescribed that not only the cost of the particular sewer should be assessed on the abutter, but also a proportionate part of the cost of all other sewers through which the same discharged.

Acts and Resolves passed by the General Court of Massachusetts, 1879.

(Chapter 55.)

Be it enacted, etc.:

SECTION 1. Section 3 of chapter 232 of the Acts of the year 1878 is hereby amended by adding at the end thereof the following words: "*provided, however,* that in respect to any estate fronting upon such street or way which by reason of its grade or level, or for any other cause, cannot be drained into such sewer, the selectmen shall not ascertain, assess, and certify the assessment thereon, or give notice of such assessment to the owner of such estate, until the incapacity of such estate to be drained into such sewer has been removed.

Approved February 21, 1879.

Public Statutes. Enacted November 19, 1881, to take effect February 1, 1882.

(Chapter 50.)

SECT. 4. Every person who enters his particular drain into such main drain or common sewer, or who, by more remote means, received benefit thereby for draining his cellar or land, shall pay to the city or town a proportional part of the charge of making and repairing the same, and of the charge, not already assessed, of making and repairing other main drains and common sewers through which the same discharges, to be ascertained, assessed, and certified by the mayor and aldermen or selectmen; and notice thereof shall be given to the party to be charged, or to his tenant or lessee.

SECT. 5. Assessments so made shall for one year after they are laid constitute a lien on the real estates assessed, and may, together with incidental costs and expenses, be levied by sale of such real estate, if the assessment is not paid within three months after a written demand for payment, made either upon the person assessed or upon any person occupying the estate; such sale to be conducted in like manner as sales for the payment of taxes.

SECT. 6. A person aggrieved by such assessment may, at any time within three months after receiving notice thereof, apply for a jury. Such application shall be made in like manner and the proceedings

thereof shall be the same as in case of lands taken for laying out highways; *provided*, that before making his application the party shall give one month's notice in writing to the selectmen or road commissioners, or mayor and aldermen, of his intention so to apply, and shall therein particularly specify his objections to the assessment; to which specification he shall be confined upon the hearing by the jury.

SECT. 7. The city council of a city or the legal voters of a town may adopt a system of sewerage for a part or the whole of its territory, and may provide that assessments under section 4 shall be made upon owners of estates within such territory by a fixed uniform rate, based upon the estimated average cost of all sewers therein, according to the frontage of such estates on any street or way where a sewer is constructed, or according to the area of such estates within a fixed depth from such street or way, or according to both such frontage or area; but no assessment in respect to any such estate which, by reason of its grade or level, or for any other cause, cannot be drained into such sewer, shall be made, certified, or notified until such incapacity is removed.

SECT. 11. Nothing herein contained shall prevent a city or town from providing, by ordinance or otherwise, that a part of the expense of constructing, maintaining, and repairing main drains or common sewers shall be paid by such city or town. And in the city of Boston not less than one quarter of such expense shall be paid by the city, and shall not be charged upon those using the main drains or common sewers.

SECT. 25. In a city or town which has accepted the provisions of this section or of chapter 249 of the Statutes of 1878, if the owner of real estate within sixty days after notice of a sewer or sidewalk assessment thereon notifies in writing the board making such assessment to apportion the same, said board shall apportion it into three equal parts, and certify such apportionment to the assessors; and the assessors shall add one of said parts, with interest from the date of apportionment, to the annual tax of said real estate for each of the three years next ensuing. All liens for the collection of such assessments shall continue until the expiration of two years from the time when the last instalment is committed to the collector; and all sewer and sidewalk assessments remaining unpaid after the time of payment stated in the order making the same shall draw interest from such time until paid.

Section 25 passed 1878. Accepted by the city January, 1885.

Chapter 145 of the Acts of 1883.

Section five of chapter fifty of the Public Statutes, relating to sewer assessments constituting a lien upon real estate, is hereby amended by adding thereto the following clause, viz.: "And real estate so sold may be redeemed the same as if sold for the non-payment of taxes, and in the same manner." April 24, 1883.

Chapter 237 of the Acts of 1884.

SECTION 1. All assessments on account of betterments and other public improvements which are a lien upon real estate shall bear interest from the thirtieth day after assessment until paid.

SECT. 2. In case of any suit or other proceeding calling in question the validity or amount of such assessment, the assessment shall continue to be a lien for one year after final judgment in such suit or proceedings, and may, with all costs and interest, be collected by virtue of such lien in the same manner as provided for the original assessment.

Approved May 15, 1884.

Chapter 210 of the Acts of 1886.

Section five of chapter fifty of the Public Statutes is hereby amended so that assessments for main drains or common sewers hereafter made shall constitute a lien on the real estates assessed for two years instead of one year.

Passed May 14, 1886.

Chapter 456 of the Acts of 1889.

AN ACT TO PROVIDE FOR THE MAKING AND COLLECTING OF SEWER
ASSESSMENTS IN THE CITY OF BOSTON.

SECTION 1. The owner of each estate in the city of Boston bordering on a street or on a strip of land through which a main drain or common sewer shall hereafter be constructed in said city, may enter a particular drain into such main drain or common sewer from that part of said estate which is situated within one hundred feet from said street or strip of land; and shall upon and after such entry pay to the said city an assessment on such estate equal to the number of square feet of land thereof, within one hundred feet of such street or strip of land multiplied by the number representing one two-hundredth part of the average cost per running foot of all the main drains and common sewers of the city of Boston, built during the five fiscal years preceding the date of the order to build such main drain or common sewer.

No estate shall be assessed more than once for the construction of a drain or sewer except as hereinafter provided, but such estate may be assessed in the manner aforesaid for the cost of renewal or repair of a drain or sewer.

SECT. 2. The amount of every such assessment shall, immediately upon the completion of the main drain or common sewer, be made and determined by the superintendent of sewers of said city, and interest shall be added to the amount assessed at the rate of five per cent. per annum from the date of completion of the main drain or common sewer, as certified in writing by said superintendent in a book to be kept for that purpose in his office; and notice of the date of such completion and of the amount of such assessment shall be given by said superintendent to the person assessed forthwith after the amount of the assessment has been determined.

SECT. 3. The owner of an estate not bordering on a street or strip of land through which a main drain or common sewer is constructed, or of an estate bordering on such street or strip of land extending more than one hundred feet in depth therefrom, may, after the amount of the assessment on such estate to be paid therefor has, on the petition of such owner, been fixed by the board of aldermen of said city, enter from such first-named estate, or from any part of such last-named estate, situated more than one hundred feet from the street or strip of land, a particular drain into the main drain or common sewer, and shall upon and after such entry pay to the said city the amount of the assessment fixed as aforesaid; but such amount shall not exceed the amount he would have had to pay under section one of this act if his estate had bordered on such street or strip of land and had been only one hundred feet in depth therefrom.

SECT. 4. Upon the request of an owner of an estate on which an assessment has been made under this act, made to the board of assessors of said city within ten days after any entry aforesaid, said board of assessors shall apportion the same into three equal parts, and shall add one of said parts with interest as aforesaid to the annual tax of said estate for each of the three years next ensuing.

SECT. 5. Every assessment made under this act shall constitute a lien upon the estate assessed until it is paid, and may with all incidental costs and expenses be levied and collected, in the same manner as taxes

on real estate are levied and collected; and a person aggrieved by any such assessment may, at any time within ten days after any entry aforesaid, apply for and have an abatement of his assessment in the same manner and under like rules of law as a person may apply for and have an abatement of taxes.

SECT. 6. This act shall take effect upon its passage.

Approved June 7, 1889.

IN BOARD OF ALDERMEN, October 7, 1889.

Ordered, That the amount of sewer assessment which any owner of an estate not bordering on a street or strip of land through which a main drain or common sewer is constructed, or of an estate bordering on such street or strip of land extending more than one hundred feet in depth therefrom, shall pay, upon entry into said main drain or common sewer, is hereby fixed and determined at the same amount per square foot which the estates bordering on said street or strip of land are obliged to pay, under the provisions of chapter 456 of the Acts and Resolves of the Legislature of 1889. And the Superintendent of Sewers is hereby instructed to levy assessments for such amounts on all parties applying for permission to enter said main drains or common sewers from estates coming under the provisions of section 3 of said chapter.

Chapter 346 of the Acts of 1890.

AN ACT TO AMEND AN ACT RELATING TO SEWER ASSESSMENTS IN THE CITY OF BOSTON.

Be it enacted, etc., as follows:

SECTION 1. Section one of chapter four hundred and fifty-six of the acts of the year eighteen hundred and eighty-nine is hereby amended by striking out, in the ninth line, the words, "the number of square feet," and inserting in place thereof the words "one cent for each square foot," and also by striking out all after the word "land" in the tenth line, and before the words "No estate" in the fifteenth line, and inserting in place thereof the words: "*provided, however,* that if the total amount of the assessments for said sewer exceeds the total sum of the cost of the sewer, plus a proportionate part of the cost of the outlet thereof, each of said assessments shall be proportionately reduced so that the total amount thereof shall be equal to said sum," so that said section shall read as follows:

Section 1. The owner of each estate in the city of Boston bordering on a street or strip of land through which a main drain or common sewer shall hereafter be constructed in said city may enter a particular drain into such main drain or common sewer from that part of said estate which is situated within one hundred feet from said street or strip of land; and shall upon and after such entry pay to said city an assessment on such estate equal to one cent for each square foot of land thereof within one hundred feet of such street or strip of land; *provided, however,* that if the total amount of the assessments for said sewer exceeds the total sum of the cost of the sewer, plus a proportionate part of the cost of the outlet thereof, each of said assessments shall be proportionately reduced, so that the total amount thereof shall be equal to said sum. No estate shall be assessed more than once for the construction of a drain or sewer, except as hereinafter provided, but such estate may be assessed in the manner aforesaid for the cost of renewal or repair of a drain or sewer.

SECT. 2. Section five of said chapter is hereby amended by striking out, in the second line, the word "assessed," and inserting in the place thereof the words, "on which the assessment is made;" also by striking out, in the fourth and fifth lines, the words "levied and," and also by striking out all after the word "collected" in the fifth line, and insert-

ing in the place thereof the words: "The city collector of said city shall have power to collect, and the assessors of taxes of said city shall have power to abate, such assessments; and all laws relating to the collection and abatement of taxes in said city shall, so far as applicable, apply to the collection and abatement of such assessments; and when an assessment is made upon a person or corporation by law exempt from the assessment of taxes, the said assessors shall notify said collector not to enforce the collection of such assessment; but when an estate, the collection of the assessment upon which has not been enforced under such notice, comes into the possession of another person as owner, the amount of such assessment shall be paid by such new owner in like manner, subject to the same provisions of law as if an original assessment," so that said section as amended shall read as follows:

Sect. 5. Every assessment made under this act shall constitute a lien upon the estate on which the assessment was made until it is paid, and may, with all incidental costs and expenses, be collected in the same manner as taxes on real estate are collected.

The city collector of said city shall have power to collect, and the assessors of taxes of said city shall have power to abate, such assessments; and all laws relating to the collection and abatement of taxes in said city shall, so far as applicable, apply to the collection and abatement of such assessments; and when an assessment is made upon a person or corporation by law exempt from the assessment of taxes, the said assessors shall notify said collector not to enforce the collection of such assessment; but when an estate, the collection of the assessment upon which has not been enforced under such notice, comes into the possession of another person as owner, the amount of such assessment shall be paid by such new owner in like manner, subject to the same provisions of law as if an original assessment.

SECT. 3. The board of aldermen of said city shall adjust all sewer assessments made under this act so that the said assessments shall be as if made under the said act as hereby amended, and said city shall thereupon refund any excess in the amount of said assessments paid to said city.

SECT. 4. The repeal or alteration by this act of any provisions of law shall not affect any act done, liability incurred, or right accrued and established, or any suit or proceedings to enforce such right or liability, under the authority of the laws hereby repealed or altered, except as hereinbefore provided.

SECT. 5. This act shall take effect upon its passage.

Approved May 28, 1890.

An Ordinance to amend Chapter 18 of the Revised Ordinances of 1890, relating to the Street Department, as approved by the Mayor, March 9, 1891.

SECTION 5. Said superintendent [of streets] shall keep a book in which he shall record the date of every order for constructing a sewer, the name of the contractor or builder constructing it, the date of commencing and the date of completing the work, and the cost of the sewer; also a book in which he shall certify the names of the owners of estates assessed for the constructing of the sewer, the number of feet of land of each estate bordering on the street or strip of land in which the sewer was laid, the depth of each estate, the amount of each assessment, the date of completion of the sewer, and the dates when the notices of assessment were given.

He shall make and deliver to the city collector all bills for assessments as they become due.

SECT. 10. . . . but before issuing a permit for entering a particular drain into a public sewer, from land upon which a sewer assessment has not been paid, he [superintendent of streets] shall be paid for the city

an assessment of one cent per square foot, for all land in the estate from which the entry is made, within one hundred feet of the street or strip of land in which the sewer or particular drain is laid, except as otherwise provided in section 1 of chapter 346 of the Acts of 1890.

Chapter 402 of the Acts of 1892.

AN ACT RELATING TO SEWERS IN THE CITY OF BOSTON.

Be it enacted, etc., as follows :

SECTION 1. The mayor and aldermen of the city of Boston may order that the superintendent of streets of said city make a sewer or sewers in any highway or strip of land and any other places in said city, specifying in the order the locations, sizes, and materials for the sewer or sewers, and the said superintendent shall carry out said order.

SECT. 2. Any expenses incurred for any work so ordered and performed shall be paid out of the moneys appropriated under the provisions of section one of chapter three hundred and twenty-three of the acts of the year eighteen hundred and ninety-one, and shall, to an amount not exceeding four dollars for each lineal foot of sewer, be repaid to said city as the assessable cost of the work, by the owners of the several parcels of land bordering on the highway or strip of land in which the sewer is made.

SECT. 3. Said superintendent shall so apportion the assessable cost to the parcels of land aforesaid that the amount apportioned to each parcel shall bear to the total assessable cost the proportion which the number of lineal feet of each parcel on said highway or strip of land bears to the number of such lineal feet of all such parcels, and a lien shall attach to the parcel and to any buildings which may be thereon for such amount, as a part of the tax of said parcel. Said superintendent shall give notice of the amount of every such assessment and the interest thereon to the owner of the parcel liable therefor, forthwith after such amount has been determined.

SECT. 4. When an assessment is made for a parcel of land for which the owner is by law exempt from being taxed, as determined and certified to by the assessors of said city on application to them therefor, the collector of taxes of said city shall suspend the collection of such assessment; but after the day on which the parcel ceases to be owned by a person or corporation so exempt, the amount of such assessment, less any payment made for an entry under the following section, shall be collected as if that day were the date of the passage of the aforesaid order for making the sewer.

SECT. 5. The owner of any parcel of land on which an assessment has been made for said cost, and the collection of which has not been suspended, under the provisions of the preceding section, may enter from any part thereof, within one hundred and twenty-five feet of said highway or strip of land, a particular drain into such sewer, and the owner of any parcel of land, the collection of the assessment upon which has been so suspended, or of any other parcel of land, may, after the amount to be paid for an entry has been fixed by the mayor and aldermen of said city, enter a particular drain from such parcel into said sewer, and there shall be due and payable to said city, upon any such entry, the amount of the assessment apportioned or fixed as hereinbefore provided.

SECT. 6. The provisions of sections sixteen, seventeen, and eighteen of chapter three hundred and twenty-three of the acts of the year eighteen hundred and ninety-one, and acts in amendment thereof, so far as applicable, apply to all assessments made under this act.

SECT. 7. Chapter four hundred and fifty-six of the acts of the year eighteen hundred and eighty-nine, and chapter three hundred and forty-six of the acts of the year eighteen hundred and ninety, are hereby

repealed, and sewers in said city shall hereafter be made and paid for only in accordance with the provisions of this act or the provisions of chapter three hundred and twenty-three of the acts of the year eighteen hundred and ninety-one and acts in amendment thereof.

SECT. 8. This act shall take effect upon its passage.

Approved June 16, 1892.

Chapter 418 of the Acts of the Year 1892.

Section 16 of chapter 323 of the acts of the year 1891 amended.

If the amount of the aforesaid assessable cost for which any parcel of land is liable, determined as provided in section fifteen, is not paid before the expiration of one year from the date of said determination, or if such amount as found by the court, on an appeal or other suit or proceeding, is not paid before the last day of May next succeeding the finding of the court, in each case with interest from the date of the passage of the aforesaid order of said street commissioners, at the rate of four and one-half per cent. per annum, the board of assessors of said city shall include a sum equal to nine per cent. of such amount in the next succeeding annual tax bills issued for the tax on the said parcel, and in the tax bills issued the first year shall also include interest on the whole of said amount at the rate of four and one-half per cent. per annum from the date of the aforesaid order to the last day of October of the year of the date of such tax bill, and in the tax bills for each succeeding year shall include one year's interest on the whole of said amount at the aforesaid rate, and shall so include such sums and interest until ten such sums with interest have been paid; said board shall issue tax bills for such sums for any parcels for which no tax bill would otherwise be issued. Every such sum in a tax bill shall be abated, collected, and paid into the city treasury, as if a part of and in the same manner as the city taxes.

Section 17 of chapter 323 of the acts of the year 1891 amended.

The owner of any parcel of land aforesaid may at any time pay to said city the balance of the amount of the said assessable cost for which his parcel is liable, remaining due after deducting therefrom the several sums, exclusive of interest, included in tax bills as provided in section sixteen, with interest on the whole amount assessed at the rate of four and one-half per centum per annum from the last day of October preceding, to the date of payment, and his parcel shall then be relieved from further lien and liability for said cost, or he may at any time pay a part of said balance, and the board of street commissioners may then, at their discretion, with the approval of the mayor, relieve a proportional part of said parcel from further liability and lien for said cost.

Approved June 16, 1892.

(N.B.—The Board of Aldermen have taken no action in regard to fixing the amount to be paid for entry into sewer by the owner of a parcel of land, the collection of the assessment upon which has been suspended).

SEWER ASSESSMENTS. (DISCUSSION.)

The question of assessing the cost of a sewer upon the people benefited by its construction is a perplexing one. The foregoing *résumé* of laws and statutes relative to sewers shows how the method of assessment has been repeatedly changed.

The earliest law (1709) provided that the inhabitants of

the town build their own sewers and pay for them, and no reference in this law is therefore made to assessments.

The law of 1823, which first provided that the city should build the sewers, was very indefinite concerning the method of assessment; and as future laws referred to the manner in which the expense of all sewers built and not previously assessed was to be collected, it is fair to suppose that trouble was experienced in interpreting the law of 1823 in regard to assessments.

The law of 1834 introduced a clause referring to the valuation of the estate benefited by the sewer, which was to have some bearing on the amount of the assessment levied. As the law did not specify exactly in what manner the valuation of the estate bears on the amount of the sewer assessment, it must have been impossible to determine the amount of sewer assessments.

The law of 1841 provided that the city should assume one quarter of the cost of construction of the main sewers.

This clause was probably introduced on account of the increased cost of main sewers. The assessing of the whole expense of large main sewers on the abutters probably proved burdensome, and this method was adopted to even up the difference in cost of main and branch sewers.

The amendment of the ordinance of 1875 in regard to sewer assessments provides that the benefit from sewers should be proportionate to the *area* instead of to the *value* of abutting property.

The report of the Superintendent of Sewers of that year mentions that "the change has diminished the amount of arbitrary judgment demanded in fixing values and reduced the labor of equably apportioning the cost of sewers."

The next radical change is found in the law of 1878, in which it is provided that a person who enters his drain into a common sewer shall not only pay a proportional part of the cost of the common sewer, but also a proportional part of the cost of all other common and main sewers through which the particular sewer discharges.

While this law had the advantage that after the cost of all sewers in a given drainage district had been determined, it would be possible to assess the cost on the abutters in such a manner that all assessments were in proportion to the benefit gained, and while it solved the vexed question of whether a drain was a main drain and the city should therefore pay one-quarter of the expense, or whether it was a common drain and the abutter should therefore pay the whole cost, it had the great disadvantage that it became impossible to levy sewer assessments until every sewer in the drainage area had

been completed, as the cost of mains through which a branch sewer discharged was in some cases an unknown quantity.

The following extract from the report of the Superintendent of Sewers for the year 1887 is given as bearing on this subject, and as bearing on the general question of sewer assessment laws in force at that time :

The question of how to equitably assess a proportion of the cost of sewers upon those deriving benefit therefrom is a vexing one.

The ordinary interpretation of the statutes and the city ordinances bearing upon the question allows such a large margin for the exercise of judgment, that there is always a chance for objections being raised and dissatisfaction expressed at every schedule of assessment.

The present method (1887) of laying assessments is based upon the custom of the department for the last fifteen years, and though having, perhaps, some points in its favor, is certainly open to objections.

A party draining into a sewer receives the same benefit per square foot of land drained, or any other unit, whether entering a 10-inch, 12-inch, or 15-inch pipe sewer, or a 4-foot sewer, whether the sewer is laid in easy digging or in a rock cut; and as, according to the present method (1887) of making up assessments, the cost of the particular sewer in front of the premises to be drained (except in the case of main sewers) is the basis on which the assessment is calculated, one sewer may call for an assessment \$0.005 per square foot, and another, where rock cutting or other obstacle is encountered, may call for as high as \$0.04 or \$0.05 per square foot for exactly the same benefit; *i.e.*, the right of entering the sewer for the purpose of drainage. There being this difference in the charges, parties desiring sewers generally assume the smallest cost when petitioning for sewers, and are dissatisfied if the bills, when rendered, amount to more.

I am satisfied that the uniform rate per square foot of land benefited, or a uniform cost per linear foot of sewer, can be established, based upon the average cost of sewers already built, which will yield an equal amount of revenue to the city, and be more equitable and satisfactory to those assessed.

This fixed charge being known in advance, parties wanting sewers may determine to a certainty what they will have to pay, and therefore be able to decide intelligently on the advisability of petitioning the Board of Aldermen. It is difficult to see why an individual, in order to drain his house lot, should be called upon to pay a high rate because rock or other obstacle was encountered during the construction of a sewer in his immediate vicinity, or because the conditions were such as to render an 18-inch pipe necessary, when in other places a 10-inch pipe might answer.

As the question of assessments is an important one, and involves a deal of study to find out, through the successive changes in statutes and ordinances, why the present system was adopted, I would recommend that a special committee, or the Committee on Sewers of the Board of Alderman, together with the Corporation Counsel and the Superintendent of Sewers, take the matter under consideration, with a view to seeing if the present system could not be improved upon.

In accordance with the recommendation of the Superintendent of Sewers, the passage of Chapter 450 of the Acts of 1889 was obtained, providing for an assessment on land within 100 feet of the street in which the sewer was situated, amounting to the sum obtained by multiplying the

number of square feet of land within 100 feet of the street by the number representing one two-hundredth part of the average cost per running foot of all the main and common sewers of the city of Boston built during the five fiscal years preceding.

Assuming that land extended back 100 feet from the street, and that the average cost of all sewers was \$4.00 per linear foot, this method gave an assessment of two cents per square foot.

This act, which returned a fair percentage of the cost of sewers to the city treasury, was amended by Chapter 346 of the Act of 1890, by making the sewer assessment one cent per square foot of land instead of two cents, and further provided that if the cost of the sewer was less than the amount returned to the city by an assessment of one cent per square foot, then the assessment should be reduced proportionately.

All sewer assessments made under the Act of 1889 were adjusted according to the Act of 1890, and the money collected was refunded.

In order to show the effect of the law of 1878 and the law of 1889, as amended in Chapter 346 of the Acts of 1890, on the finances of the city, the following tables are inserted. As shown by the tables the practical effect of the law of 1878 is to return to the city treasury only 38 per cent. of the amount expended for sewer construction, and the effect of the law of 1889, as amended in 1890, is to return only 21 per cent. of the amount expended.

Table I. — Sewer Assessments made under the Law of 1878.

Year (Jan. to Jan.).	Total Expenditures of Sewer Division.	Amount Expended for Construction of Sewers.	Amount Assessments Levied.	Year (May to May).	Assessments received by City Collector for Collection.	Amount Assessments Abated.	Amount Assessments Collected.	Amount Assessments Uncollected.
1879	\$105,486 26	\$41,194 20	\$23,231 49	1879-80	\$20,657 79	\$1,807 04	\$18,850 75	.....
1880	125,705 39	51,958 43	37,547 87	1880-81	39,863 80	2,008 17	37,855 63	.....
1881	185,219 08	98,488 33	59,127 24	1881-82	66,403 64	9,977 93	56,425 71	.....
1882	243,195 22	155,027 62	60,963 29	1882-83	60,730 99	3,854 48	56,824 41	\$52 10
1883	262,507 07	154,804 59	19,310 19	1883-84	27,617 64	3,521 25	24,096 39	.....
1884	336,542 06	240,027 27	14,334 81	1884-85	16,163 95	1,689 47	14,324 48	150 00
1885	404,812 24	251,697 75	143,877 54	1885-86	177,151 35	20,754 08	156,397 27	.....
1886	600,920 65	442,157 78	62,377 27	1886-87	71,702 32	16,480 93	55,221 39	.....
1887	479,152 40	262,527 23	116,110 49	1887-88	99,601 08	16,477 19	83,123 89	.....
1888	1,016,618 50	129,268 49	151,017 48	1888-89	125,113 93	11,651 21	112,246 24	1,216 48
Totals	\$3,760,158 87	\$1,827,151 69	\$687,897 67	.....	\$705,006 49	\$88,221 75	\$615,366 16	\$1,418 58

Amount expended for construction of Stony Brook Improvement:

1887	\$40,971 79
1888	567,450 61
	<u>\$608,422 40</u>

Amount expended for maintenance of Main Drainage Works, 1888, \$72,024.41.

Previous to 1888 the Main Drainage Works were in charge of the City Engineer.

Of the amount expended for sewer construction, \$1,827,151.69, the sum of \$687,897.67 has been levied against abutting estates in the form of assessments; this amount being about 38 per cent. of the actual cost of the sewers constructed. Between 1879 and 1889 assessments amounting to \$88,221.75 were abated, or about 12½ per cent. of the assessments deposited. On this basis the amount received by the city on the expenditure of \$1,827,151.69 would be about \$601,911, or 33 per cent.

An analysis of this table shows that of the sum of \$3,760,-158.87, the sum of \$1,827,151.69 was expended for actual sewer construction; of the balance, or \$1,933,007.18, the sum of \$608,422.40 was expended for Stony Brook construction, and the sum of \$1,324,584.78 was expended for the maintenance of the Sewer Division, including the maintenance of the Main Drainage Works.

Of the amount expended for sewer construction, the sum of \$687,897.67 has been levied against abutting estates in the form of assessments; this amount being about 38 per cent. of the actual cost of the sewers constructed.

The amount of assessments levied, in comparison with the amount expended for sewer construction, has varied largely from year to year, both on account of former looseness in making up sewer assessments, and also owing to the changes which have been made in the laws. An inspection of this table shows that in 1884 the sum of \$240,027.27 was expended for sewer construction, and only the sum of \$14,334.81 was levied in assessments. On the other hand, in 1888 the sum of \$129,268.49 was expended for sewer construction, and the sum of \$151,017.48 was levied in assessments. This is accounted for by the fact that the department that year made up a large number of back assessments which had been allowed to accumulate.

OPERATION OF THE LAW OF 1889 AS AMENDED IN 1890.

In order to determine the exact amount which the city received in assessments for sewers constructed under the law of 1889, as amended in 1890, the following table has been prepared showing the cost and amount assessed of every sewer built under this law. The table shows that the cost of building 151 sewers amounted to \$637,785.38, of which amount the city assessed the sum of \$132,594.78 on the abutters, or about twenty-one per cent.

Table No. II.—Sewer Assessments under Law of 1889 as amended in 1890.

Sewers built under Chap. 456 of the Acts of 1889, as amended by Chap. 346 of the Acts of 1890.	Cost.	Assessment.	Assumed by City.	Rate per foot sewer.
Adams, Beaumont, and Burgoyne streets, Ward 24	\$5,899 32	\$1,410 83	\$4,488 49	\$5 72
Adams and Codman sts., Ward 24 . . .	21,095 01	4,078 54	17,016 47	8 07
Alban street, Ashmont to end of sewer, Ward 24	343 26	355 00	. . . . .	1 06
<i>Carried forward</i>	\$27,337 59	\$5,844 37	\$21,504 96	. . . . .

Table No. II. — Continued.

Sewers built under Chap. 456 of the Acts of 1889, as amended by Chap. 346 of the Acts of 1890.	Cost.	Assessment.	Assumed by City.	Rate per foot sewer.
<i>Brought forward</i>	\$27,337 59	\$5,844 37	\$21,504 96	. . . . .
Allston street, Medford to Bunker Hill, Ward 4	880 10	352 30	527 80	\$1 97
Arlington street, Ward 25	4,203 50	1,490 91	2,712 59	3 69
Ashford st., Chester to Malvern, Ward 25,	448 35	486 33	. . . . .	1 42
Ashmont street, Ward 24	1,240 32	1,176 99	63 33	1 50
Ashmont street, private land, Washington street, and part of Armandine street, Ward 24	14,887 11	2,552 98	12,334 13	8 68
Back street, Austin street, and private land, Wards 23, 24	11,816 34	. . . . .	11,816 34	4 72
Bailey street, Ward 24	5,059 78	2,848 93	2,210 85	2 81
Bainbridge street, Ward 21	1,321 78	192 49	1,129 29	11 89
Baldwin street, Ward 4	672 99	7 35	665 64	2 61
Bay street, private land, Springdale street, etc., Savin Hill ave., and Gramplan way, Ward 24	623,929 45	7,695 06	16,234 39	5 41
Bay State road, Ward 22	1,502 01	1,052 16	449 85	6 18
Beacon street, Mountfort street to R.R., Ward 22	454 82	. . . . .	454 82	4 17
Bellevue and Kane streets, Ward 24	3,520 50	814 70	2,705 80	5 81
Blue Hill avenue, Dewey to Dalmatia, Ward 20	501 27	303 11	198 16	3 02
Blue Hill ave., Southwood to Damascus, Ward 20	640 21	600 35	39 86	1 69
Border, Eutaw to White st., Ward 1	1,563 09	1,153 73	409 36	2 32
Border, White to Condor, Ward 1	1,080 22	1,004 22	76 00	1 48
Bowdoin street, Ward 24	1,299 97	1,288 00	11 97	1 73
Bremen st., Porter to Brooks, Ward 1	12,004 42	1,255 98	10,748 44	10 90
Brent street, Ward 24	924 35	821 54	102 81	1 54
Bunker Hill st., Ferrin to Green, Ward 2,	3,315 71	520 94	2,794 77	5 84
Bunker Hill st., Green to Concord, Ward 2,	429 70	. . . . .	429 70	6 34
Burnett street, Ward 23	569 16	647 26	. . . . .	1 07
Byron street, Cowper to Coleridge, and Coleridge st., Byron to Rice, Ward 1	1,499 77	1,208 00	291 77	1 86
C street, Fifth to Sixth, Ward 13	821 93	136 75	685 18	3 63
Call street, Ward 23	1,033 37	487 86	545 51	1 81
Calumet and Sachem sts., Ward 22	17,196 42	2,466 61	14,729 81	9 74
Cambridge street, North Beacon to Webster avenue, Ward 25	1,292 78	684 40	608 38	2 90
Cambridge street, from Saunders street, westerly, Ward 25	1,521 96	1,014 33	507 63	2 84
<i>Carried forward</i>	\$142,968 97	\$38,107 65	\$104,989 14	. . . . .

Table No. II. — Continued.

Sewers built under Chap. 456 of the Acts of 1889, as amended by Chap. 346 of the Acts of 1890.	Cost.	Assessment.	Assumed by City.	Rate per foot sewer.
<i>Brought forward</i>	\$142,968 97	\$38,107 65	\$104,989 14	. . . . .
Carruth st., Minot to Codman, Ward 24 .	875 61	563 52	312 09	\$2 18
Cedar place, Ward 20	1,181 84	202 56	979 28	4 55
Centre st., Highland to Marcella, Ward 21,	379 84	163 63	216 21	2 45
Centre street, Pond to Lakeville pl., Ward 23	4,910 96	850 00	4,060 96	9 43
Chelsea st., Vine to Perry, Ward 3 . . .	1,380 64	258 92	1,121 72	2 42
Childs street, Ward 23	246 46	52 25	194 21	1 34
Cleveland place, Ward 6	320 88	73 09	247 79	5 09
Cohasset street, Corinth street to Stony Brook, Ward 23	1,349 25	1,152 46	196 79	2 15
Colton st., First to Second, Ward 13 . .	370 01	. . . . .	370 01	1 88
Columbia street, New Seaver to Oakland, Ward 24	311 84	. . . . .	311 84	2 08
Common and Adams streets, Ward 5 . .	1,247 22	290 72	956 50	3 80
Commonwealth avenue, Charlesgate W. to Brookline avenue, Ward 22	12,816 11	1,066 80	11,749 31	11 28
Commonwealth ave., Brookline ave. to Essex street, Ward 22	37,677 00	5,916 44	31,760 56	5 87
Condor st., Meridian to Border, Ward 1,	324 07	324 07	. . . . .	1 19
Conder st., Brooks to Putnam, Ward 1 .	625 52	625 52	. . . . .	0 92
Crawford street, south-east from Hol- land, Ward 21	5,218 94	1,802 43	3,416 51	4 60
Crawford and Holland sts., Ward 21 . .	7,865 41	879 49	6,985 92	1 30
Creighton street, Ward 22	1,194 28	1,146 28	48 00	1 72
Dalmatia and Cherry sts., Ward 20 . . .	753 79	120 80	632 99	2 38
Day st., Minden to Mansur, Ward 22 . .	1,249 60	257 37	992 23	5 85
Decatur st., Meridian to Border, Ward 2,	7,928 69	542 21	7,386 48	8 34
Dewey street, Dacia to Blue Hill avenue, Ward 20	547 01	308 36	238 65	2 13
Dorchester avenue, Crescent avenue, northerly, Ward 24	1,506 37	914 63	591 74	2 17
Dunreath street, Warren, 200 feet east, Ward 21	1,320 72	118 33	1,202 39	4 62
Dunstable street, Ward 5	232 27	139 30	92 97	2 29
Dustin street, Ward 25	6,153 33	2,360 48	3,792 85	4 30
Edson street, Ward 24	1,710 86	1,419 33	291 53	1 50
Essex street, Ward 4	782 33	322 99	459 34	1 90
Essex and Federal streets and Mount Washington avenue, Ward 12	57,061 22	. . . . .	57,061 22	24 44
Everett street, Ward 25	1,451 32	492 87	958 45	4 68
<i>Carried forward</i>	\$301,962 36	\$60,472 50	\$241,617 63	. . . . .

Table No. II. — *Continued.*

Sewers built under Chap. 456 of the Acts of 1889, as amended by Chap. 346 of the Acts of 1890.	Cost.	Assessment.	Assumed by City.	Rate per foot sewer.
<i>Brought forward</i>	\$301,962 36	\$60,472 50	\$241,617 68	. . . . .
Exeter street, Providence to Huntington avenue, Ward 11	705 82	34 20	671 62	\$2 36
Falcon st., Brooks to Putnam, Ward 1 . .	1,748 82	936 24	812 58	2 36
Faneuil street, Ward 25	81 84	82 34	. . . . .	1 47
Florence street, Ward 23	1,178 95	864 54	314 41	2 31
Franklin street, east from Raymond, Ward 25	359 10	249 00	110 10	1 38
Gladstone street, Ward 1	40,447 29	8,525 00	31,922 29	7 09
Leyden street, Ward 1				
Walley street, Ward 1				
Bennington street, Ward 1				
Gustin street, Ward 15	574 78	381 82	192 96	1 66
Hill street, Ward 4	886 05	85 33	800 72	3 71
Hillside street, Parker Hill avenue to Sunset, Ward 22	700 38	458 41	241 97	2 33
Homer st., Byron to Moore, Ward 1, and Byron, Homer to Horace	1,845 65	1,000 00	845 65	2 16
Horace st., Moore to Byron, Ward 1 . .	894 59	898 36	. . . . .	1 42
Howard avenue, Ward 20	1,124 82	121 88	1,002 94	6 47
Hudson st., Curve to Beech st., Ward 12,	24,098 07	1,209 74	22,888 33	14 63
Humboldt avenue, Walnut avenue to Munroe, Ward 21	2,546 26	746 43	1,799 83	3 12
Humboldt avenue, Homestead to Seaver, Ward 21	1,964 58	1,012 16	952 42	11 26
Irvington street, Ward 11	623 78	623 78	. . . . .	1 47
Jeffries st., from No. 11 to Everett st., Ward 2	266 68	135 00	131 68	1 70
Kent street, Ward 19	2,558 97	370 83	2,188 14	5 08
Kilby street, Ward 6	1,070 51	188 01	882 50	7 14
Kilton and Harvard streets, Ward 24 . .	13,246 74	3,374 95	9,871 79	5 47
Lamartine street and private land, Ward 23	1,166 06	. . . . .	1,166 06	2 31
Lawrence avenue, Ward 24	241 47	123 50	117 97	3 22
Liberty and Preble streets, Ward 15 . .	1,924 93	248 54	1,676 39	2 28
Lincoln street, Ward 25	238 18	238 18	. . . . .	1 20
Lynde street and outlet, Ward 5	740 01	. . . . .	740 01	1 22
Magazine street, Ward 20	4,993 48	1,634 43	3,359 05	5 21
Magnolia street, Wayland to Robert avenue, Ward 20	943 19	175 33	767 86	3 72
Magnolia and Lawrence ave., Ward 24 . .	7,896 15	1,724 92	6,171 23	8 06
Market street, Ward 25	1,440 03	343 86	1,096 17	4 34
<i>Carried forward</i>	\$418,469 54	\$86,259 28	\$332,342 35	. . . . .

Table No. II. — Continued.

Sewers built under Chap. 456 of the Acts of 1889, as amended by Chap. 346 of the Acts of 1890.	Cost.	Assessment.	Assumed by City.	Rate per foot sewer.
<i>Brought forward</i>	\$418,469 54	\$86,259 28	\$332,342 35	. . . . .
Maverick street, Maverick square to London street, Ward 2	978 72	560 21	418 51	\$1 82
Maverick st., Short to Jeffries, Ward 2	616 55	578 37	38 18	1 96
McLean street, Ward 8	1,623 22	647 17	976 05	3 11
Meridian st., Decatur to Saratoga, Wd. 2,	6,595 61	991 40	5,604 21	5 84
Monks st., Sixth to Seventh, Ward 14	336 38	. . . . .	336 38	1 64
Morris st., Brooks to Putnam, Ward 1	674 13	484 50	189 63	1 26
Mozart street, Lamartine to Chestnut avenue, Ward 23	352 52	129 30	223 22	1 41
Mozart st., Centre st., 100 ft. south, Wd. 23,	259 65	55 00	204 65	1 71
Mt. Vernon street, Dorchester avenue to Buttonwood, Ward 24	264 85	192 00	72 85	1 51
Mt. Vernon st., Boston to end of sewer, Ward 24	1,099 72	932 00	167 72	2 24
Myrtle st., Ash pl. to end of sewer, Wd. 9,	298 76	101 83	196 93	2 06
N st., Second to Third, Ward 14	349 36	330 00	19 36	1 67
Neponset ave., Adams to Mill, Ward 24,	817 20	708 93	108 27	1 36
New st., Maverick to Cross, Ward 2	321 35	321 35	. . . . .	1 59
North Harvard and Rena sts., Ward 25	5,174 16	2,301 05	2,873 11	3 77
O street, First to Second, Ward 14	461 21	185 00	276 21	1 85
Ocean st., Ashmont to Roslin, Ward 24	712 69	619 70	92 99	1 48
Orleans street, Maverick to Sumner, Ward 2	15,467 71	1,666 97	13,800 74	12 79
Sumner street, and Orleans to Cottage street, Ward 2				
Parker Hill avenue, Tremont to Hillside, Ward 22				
Parker Hill avenue, Hillside street, south, Ward 22	1,177 34	899 56	277 78	2 32
Paulding st., Bainbridge to Dale, Wd. 21,	602 21	88 48	513 73	2 67
Paul Gore street, Ward 23	2,861 47	1,457 51	1,403 96	3 69
Peter Parley street, Ward 23	414 67	61 49	353 18	2 30
Pope's Hill st. and Neponset ave., Wd. 24,	2,502 78	1,640 90	861 88	2 66
Porter st., Bremen to Bennington, Wd. 1,	13,859 05	1,051 79	12,807 26	10 53
Private st., Leyden to Walley, Ward 1	429 33	77 48	351 85	1 55
Putnam st., Bremen to Chelsea, Ward 1	322 41	160 00	162 41	1 85
Raleigh and Beacon streets, Ward 22	12,167 41	591 64	11,575 77	13 47
Randolph street, Ward 17	64,549 99	1,111 14	3,438 85	5 24
Reading street, Ward 20	676 65	450 14	226 51	1 66
Reading street, Malden lane to Farnham, Ward 20	347 90	286 34	61 56	2 64
<i>Carried forward</i>	\$495,873 20	\$105,591 37	\$390,413 92	. . . . .

Table No. II. — *Concluded.*

Sewers built under Chap. 456 of the Acts of 1889, as amended by Chap. 346 of the Acts of 1890.	Cost.	Assessment.	Assumed by City.	Rate per foot sewer.
<i>Brought forward</i>	\$495,873 20	\$105,591 37	\$390,413 92	. . . . .
Rockland street, Ward 25	633 12	240 41	392 71	\$3 54
Roslindale main sewer, Washington to Beech, Ward 23	61,779 74	8,024 20	53,755 54	9 82
Russell street, Ward 4	554 20	188 83	365 37	2 98
Sackville street, Ward 4	1,597 50	542 31	1,055 19	2 67
Scotia st., Bothnia to end of sewer, Wd. 11,	243 04	. . . . .	243 04	0 64
St. Botolph street, Garrison to Harcourt, Ward 11	1,538 07	679 94	858 13	2 93
Sterling street, Shawmut ave. to Washington, Ward 19	1,279 81	497 06	782 75	2 09
Stoughton street, Ward 18	1,896 06	1,121 31	774 75	3 65
Summer street, Ward 3	212 33	20 80	191 53	3 27
Symmes street, Ward 23	1,426 86	1,147 50	279 36	1 72
Townsend street, Ward 21	3,043 42	396 15	2,647 27	4 63
Townsend st., from Harold st. east, Wd. 21,	485 15	. . . . .	485 15	5 16
Texas street, Ward 19	1,020 94	28 92	992 02	5 12
Third street, I to K, Ward 14	430 69	298 70	131 99	1 94
Tremont street, Ward 3	314 28	83 52	230 76	3 53
Tyler street, Oak to Harvard, Ward 12, } Oak street, Harrison avenue to Hudson, Ward 12 }	12,055 79	815 97	11,239 82	13 93
Union street, Ward 25	2,610 13	1,897 86	712 27	2 25
Vine street, Ward 3	5,805 59	190 90	5,614 69	12 97
Walden st., Arklow to Centre, Ward 22	673 53	571 14	102 39	2 09
Walk Hill street, Ward 23	1,428 29	811 98	616 31	2 75
Walnut ave. and Cohden st., Ward 21	18,594 60	709 75	17,884 85	29 36
Walnut avenue, Harrishof to Holworthy, Ward 21	1,035 56	270 00	765 56	4 16
Washington street, Forest Hills to Cornwall, Ward 23	1,031 10	544 17	486 93	2 75
Waverley street, Ward 25	3,067 64	2,358 86	708 78	2 28
Welles avenue, Washington to Harley, Ward 24	753 38	591 51	161 87	1 64
Wenham street, Ward 23	2,268 66	802 98	1,465 68	3 62
West Chester Park, Beacon to Marlboro', Ward 22	307 81	. . . . .	307 81	1 92
West Park and Whitfield sts., Ward 24	2,241 70	1,557 68	684 02	2 20
Westville st., private land, and Charles st., Ward 24	613,583 19	2,610 96	10,972 23	5 67
Totals	\$637,785 38	\$132,594 78	\$505,322 69	. . . . .

a Including proportionate cost of main sewer.
b Storm sewer included.

Per cent. of cost assessed, 20.8 per cent.

Per cent. of cost collected, 13.8 per cent.

Collected to February 1, 1894, \$88,225.14.

Average cost per foot of sewer, \$5.79.

Per cent. of assessments collected, 66.5 per cent.

The assessments are one cent per square foot of land within one hundred feet of street line; for the purpose of comparison with the 1892 law, the average assessment per front foot is calculated to be eighty-four cents.

The foregoing table shows that even less money is returned to the city treasury under the law of 1890 than under the law of 1878, as the percentage assessed falls off from over thirty-eight per cent. to twenty-one per cent.

In order that a greater proportion of the expense might be assessed on the abutters the law of 1892 was passed. (See Chapter 402 of the Acts of 1892.)

Calculations made to date show that the city will recover in assessments about sixty-five per cent. of the cost of sewers instead of the thirty-three per cent. recovered under the 1878 law, and the twenty-one per cent. under the 1890 law.

The following table, from which these conclusions are derived, is published as a matter of reference :

Table No. III. — Sewer Assessments under the Law of 1892.

Assessment of sewers (built under Chap. 402 of the Acts of 1892) from June 16, 1892, to February 1, 1894.	Cost.	Rate per foot of sewer.	Assumed by City.	Assessment.	Rate per front foot.
Albano street, Ward 23	\$664 02	\$1 73	. . . . .	\$664 02	\$1 04
Alexander street, Ward 20 . . .	1,087 45	3 10	. . . . .	1,087 45	1 77
Alford street, Ward 4 }	3,367 01	3 34	. . . . .	3,367 01	1 72
Malden bridge to West }					
Alford street, Ward 4 }	651 90	4 00	. . . . .	651 90	1 72
West to Main }					
Amherst street, Ward 23	423 51	3 29	\$98 63	324 83	1 58
Ashfield street, Ward 23	733 06	1 86	. . . . .	733 06	1 06
Ashmont street and private ways, Ward 24	4,051 95	3 42	. . . . .	4,051 95	1 81
Bainbridge street, Ward 3 . . .	315 48	2 11	. . . . .	315 48	1 09
Barrington street, Ward 24 . . .	942 01	1 31	. . . . .	942 01	0 70
Bartlett street, Ward 3	455 15	2 11	. . . . .	455 15	1 18
Benedict street, Ward 5	559 77	1 69	. . . . .	559 77	0 87
Bowdoin avenue, Ward 24 . . .	463 25	2 24	. . . . .	463 25	1 47
<i>Carried forward</i>	\$13,714 56	. . . . .	\$98 63	\$13,615 88	. . . . .

Table No. III. — *Continued.*

Assessment of sewers (built under Chap. 402 of the Acts of 1892) from June 16, 1892, to February 1, 1894.	Cost.	Rate per foot of sewer.	Assumed by City.	Assessment.	Rate per front foot.
<i>Brought forward</i>	\$13,714 56	. . . . .	\$98 68	\$13,615 88	. . . . .
Boynton street, Ward 23	924 33	\$1 00	. . . . .	924 33	\$0 52
Bremen street, Ward 1	732 39	1 26	. . . . .	732 39	1 46
Brown avenue, Ward 23	1,585 51	1 94	. . . . .	1,585 51	1 03
Byron street, Ward 1 (Horace to Bennington)	333 83	1 67	. . . . .	333 83	0 83
Byron street, Ward 1 (Bennington to Saratoga)	396 84	1 98	. . . . .	396 84	0 99
Centre street, Ward 21 (Gardner to Linwood)	1,417 04	3 93	. . . . .	1,417 04	2 01
Centre street, Wards 22-23 (Wymann to Forbes)	1,359 69	3 48	. . . . .	1,359 69	1 87
Centre street, Ward 23 (near Paul Gore street)	207 34	2 76	. . . . .	207 34	1 75
Clive street, Ward 23	752 14	2 58	. . . . .	752 14	1 41
Clive street, sewer extended	349 84	1 57	. . . . .	349 84	0 86
Codman street and Dorchester avenue, Ward 24	1,346 00	1 91	. . . . .	1,346 00	1 16
Corwin and Westville streets, Ward 24	780 51	1 99	. . . . .	780 51	1 10
Cove street, Ward 12	1,007 97	3 52	. . . . .	1,007 97	1 74
Cowper street, Ward 1	572 19	1 58	. . . . .	572 19	0 85
E street, Ward 15	458 49	2 19	. . . . .	458 49	1 16
Ellwood street, Ward 5	515 19	2 42	. . . . .	515 19	1 29
Faulkner street and private land, Ward 24	1,916 09	2 27	. . . . .	1,916 09	1 16
Forest Hills street, Ward 23	1,748 33	3 99	. . . . .	1,748 33	2 17
Freeman street, Ward 24	421 97	2 55	. . . . .	421 97	1 74
Fulda street, Ward 21	327 64	2 98	. . . . .	327 64	1 81
Harbor View street, Ward 24, from Newport street, East	235 46	1 60	. . . . .	235 46	0 91
Harbor View street, Ward 24, from Sidney street, West	289 85	1 24	. . . . .	289 85	0 77
Harvard street, Ward 5	689 42	2 06	. . . . .	689 42	1 16
Harvard street, Ward 24, Algonquin to Harvard avenue	999 74	1 77	. . . . .	999 74	1 09
Harvard street, Ward 24, Kilton to Glen way	1,385 10	2 51	. . . . .	1,385 10	1 42
Harvard avenue, Ward 25	1,584 98	2 59	. . . . .	1,584 98	1 36
Hecla street, street, Ward 24	1,378 31	1 54	. . . . .	1,378 31	1 02
Henshaw street, Ward 25, Market to Menlo	1,285 76	2 07	. . . . .	1,285 76	1 25
<i>Carried forward</i>	\$38,716 51	. . . . .	\$98 68	\$38,617 83	. . . . .

Table No. III. — *Continued.*

Assessment of sewers (built under Chap. 402 of the Acts of 1892) from June 16, 1892, to February 1, 1894.	Cost.	Rate per foot of sewer.	Assumed by City.	Assessment.	Rate per front foot.
<i>Brought forward</i>	\$38,716 51	. . . . .	\$98 68	\$38,617 83	. . . . .
Henshaw street, Ward 25, Menlo to Washington	387 32	\$1 13	. . . . .	387 32	\$0 68
Hillside, Sunset and Eldora streets	1,083 75	2 12	. . . . .	1,083 75	1 24
Hillside street, sewer extended, Ward 22	173 99	1 72	. . . . .	173 99	1 51
Hillside street, Ward 22, Harles-ton to Calumet	611 25	1 78	. . . . .	611 25	0 92
Houghton street, Ward 24 . . }	2,692 00	1 92	. . . . .	2,692 00	1 01
Mill street, Ward 24 }	239 90	2 12	239 90	. . . . .	. . . . .
Johnston street, Ward 23 . . .	1,188 11	1 99	. . . . .	1,188 11	1 00
Joiner street, Ward 5	750 94	1 77	. . . . .	750 94	0 99
Kelley court, Ward 25	658 34	2 25	. . . . .	658 34	1 25
Lawn street, Ward 22	862 49	1 81	. . . . .	862 49	0 99
Lawn street, sewer extended, Ward 22	304 46	2 03	. . . . .	304 46	1 33
Longwood avenue, Ward 22, Huntington avenue to Bumstead lane	795 83	3 33	795 83	. . . . .	. . . . .
Longwood ave., Ward 22, Huntington ave. to Worthington .	402 39	2 06	. . . . .	402 39	1 33
Maxwell street, Ward 24	543 50	2 36	. . . . .	543 50	1 31
Mead street, Ward 4	1,130 22	2 37	. . . . .	1,130 22	1 29
Monument street, Ward 3 . . .	641 19	1 61	. . . . .	641 19	0 85
Mountfort street, Ward 22 . . .	1,259 52	3 15	. . . . .	1,259 52	1 80
N. Harvard street, Ward 25 . . .	1,087 30	3 14	. . . . .	1,087 30	1 71
N. Hudson street, Ward 6 . . .	304 14	1 69	. . . . .	304 14	0 91
Passage, rear St. Botolph st. . .	233 89	0 94	. . . . .	233 89	0 49
Peter Parley street, Ward 23 . .	2,606 22	2 23	. . . . .	2,606 22	1 18
Poplar street, Ward 23	4,891 96	3 25	. . . . .	4,891 96	1 84
Private land between Rockwell street and land of Nawn, Ward 24	622 46	3 83	. . . . .	622 46	2 25
Revere street, Ward 9	337 85	2 54	. . . . .	337 85	1 90
Rockland street, Ward 25, Washington to Peaceable . .	575 56	1 70	. . . . .	575 56	0 98
Rockland street, Ward 25, from Peaceable street, south . . .	167 98	1 39	. . . . .	167 98	0 75
Saratoga, Ford, Breed, and Leyden streets, Ward 1	6,076 75	3 97	. . . . .	6,076 75	2 50
School street, Ward 3	435 01	2 17	. . . . .	435 01	1 09
<i>Carried forward</i>	\$69,780 83	. . . . .	\$1,134 41	\$68,646 42	. . . . .

Table No. III. — *Continued.*

Assessment of sewers (built under Chap. 402 of the Acts of 1892) from June 16, 1892, to February 1, 1894.	Cost.	Rate per foot of sewer.	Assumed by City.	Assessment.	Rate per front foot.
<i>Brought forward</i>	\$69,780 83	. . . . .	\$1,134 41	\$68,646 42	. . . . .
School-house court, Ward 4 . .	245 38	\$1 64	. . . . .	245 38	\$0 90
Sedgwick street and private land, Ward 23	1,018 96	1 74	. . . . .	1,018 96	0 90
Shannon street, Ward 25	1,301 53	1 87	. . . . .	1,301 53	0 91
Shannon st., outlet to Shepard street	508 12	1 87	. . . . .	508 12	1 03
Shirley street, Ward 20	108 90	1 08	. . . . .	108 90	0 75
Smith street, Ward 22, between Bumstead lane and Whitney .	299 00	1 77	. . . . .	299 00	0 77
Smith street, Ward 22, between Whitney and Worthington .	211 99	1 77	. . . . .	211 99	1 25
So. Margin street, Ward 7 . . .	1,872 58	3 56	1,872 58	. . . . .	. . . . .
Sprague street, Ward 3	593 18	1 67	. . . . .	593 18	0 88
Stacey street, Ward 5	1,127 30	2 25	. . . . .	1,127 30	1 28
Sunset street, Ward 22	346 09	3 25	. . . . .	346 09	2 05
Topliff street, Ward 24	3,531 20	2 62	. . . . .	3,531 20	1 34
Townsend street, Ward 21 . . .	1,704 46	3 92	. . . . .	1,704 46	1 96
Washington street, Ward 23, Atherton to Albano	1,026 67	2 07	. . . . .	1,026 67	1 29
Washington street, Ward 25 . .	1,773 84	2 30	. . . . .	1,773 84	1 25
Whitfield street and private land, Ward 24	324 48	1 82	. . . . .	324 48	0 92
Wicklow street, Ward 25 . . .	2,679 91	1 95	. . . . .	2,679 91	1 08
Winter street, Ward 24	439 89	3 83	. . . . .	439 89	1 69
Woodbury street, Ward 19 . . .	384 42	2 44	. . . . .	384 42	1 58
Worthington street, Ward 22, between Huntington avenue and Tremont	1,140 80	1 63	. . . . .	1,140 80	0 97
Worthington street, Ward 22, between Longwood and Huntington avenues	329 76	1 65	. . . . .	329 76	0 98
Wrentham street, Ward 24 . . .	1,557 94	2 49	19 12	1,538 82	1 38
A street, Ward 23	1,849 75	4 64	256 43	1,593 32	2 02
Adams street, Ward 24, Linden to East	4,128 27	4 81	1,177 77	2,950 50	2 22
Adams street, Ward 24, East to Bowdoin street	1,097 78	4 81	185 58	912 20	2 25
Armandine and Rockwell streets, Ward 24	24,015 72	9 22	13,599 48	10,416 24	2 06
Beacon street, Ward 22	4,028 32	9 84	2,390 72	1,637 60	2 18
Bennington street, Ward 1 . . .	10,877 21	6 73	4,412 85	6,464 36	2 13
<i>Carried forward</i>	\$138,304 88	. . . . .	\$25,048 94	\$113,255 94	. . . . .

Table No. III. — *Concluded.*

Assessment of sewers (built under Chap. 402 of the Acts of 1892) from June 16, 1892, to February 1, 1894.	Cost.	Rate per foot of sewer.	Assumed by City.	Assessment.	Rate per front foot.
<i>Brought forward</i>	\$138,304 88	. . . . .	\$25,048 94	\$113,255 94	. . . . .
Boylston street, Ward 22	1,741 32	\$5 97	574 88	1,166 44	\$1 89
Cambria street, Ward 11	729 48	6 48	279 12	450 36	2 43
Carlisle street, Ward 21	1,277 49	4 89	757 43	520 06	2 43
Centre and May sts., Ward 23 .	9,571 94	5 21	2,223 42	7,348 52	2 13
Culvert and Cary sts., Ward 19 .	4,548 40	7 08	1,977 52	2,570 88	2 37
Custer street, Ward 23	1,029 77	5 70	307 37	722 40	2 64
Dewey street, Ward 20	866 84	6 50	373 04	493 80	2 00
Englewood avenue, Ward 25 . .	6,175 35	4 07	107 99	6,067 36	2 29
Harold street, Ward 21	811 62	4 65	113 14	698 48	2 15
Huntington ave., Ward 22, Vancouver st. to Longwood ave. .	8,572 28	8 67	4,616 40	3,955 88	2 17
Hutchinson street, Ward 24 . .	1,565 00	7 06	678 24	886 76	2 10
Brook st. and Dorchester ave., Ward 24	5,593 00	6 72	2,062 24	3,530 76	2 21
Lawrence avenue, Ward 24 . .	1,587 22	6 61	628 02	959 20	2 03
Magnolia street, Ward 20	1,142 38	6 37	425 18	717 20	2 24
Mt. Pleasant avenue, Ward 20 .	2,654 43	7 37	2,654 43	. . . . .	. . . . .
Norfolk avenue, Ward 20, Oak to Clapp	31,311 91	45 78	30,433 41	878 50	2 65
Norfolk avenue, Ward 20, Clapp to Magazine	20,218 60	15 40	14,965 64	5,252 96	2 20
Park street, Ward 24	6,041 92	4 53	1,648 15	4,393 77	2 49
Rena street, Ward 25	2,654 90	11 12	1,700 02	954 88	2 11
Roslindale main, Beech street	. . . . .	. . . . .	. . . . .	3,257 90	2 15
Roslindale main, Beech to Willow	26,193 13	12 03	17,888 91	1,642 80	1 96
Roslindale main, Willow to Corey . . . . .	. . . . .	. . . . .	. . . . .	3,403 52	2 05
Savin Hill avenue, Ward 24 . .	2,322 23	4 73	359 27	1,962 96	2 31
Savin Hill ave., extension, Wd. 24,	970 35	5 91	313 75	656 60	2 23
Sewall street, Ward 22	1,911 48	6 76	780 76	1,130 72	2 44
St. Stephens street, Ward 22 . .	4,671 77	12 78	3,362 65	1,309 12	2 28
Tremont street, Ward 22	2,316 19	9 65	1,356 15	960 04	2 19
Villa st. and Longwood ave. . .	24,106 31	7 41	11,085 39	13,020 92	2 09
Wesley street, Ward 2	2,041 90	5 41	531 86	1,510 04	2 52
Totals	\$310,932 09	. . . . .	\$127,253 32	\$183,678 77	. . . . .

Average cost per foot of sewer . . .	\$4.81
Average assessment per front foot . . .	\$1.62
Per cent. of cost assessed . . .	59.10%
Amount collected to February 1, 1894 . .	\$57,902.34
Per cent. of assessments collected . . .	31.50%
Per cent. of cost collected . . .	18.6%

If the main sewer in Norfolk avenue, between Oak and Clapp streets, is left out, which is a sewer of extraordinary cost, the following results are obtained :

Average cost per foot of sewer . . .	\$4.36
Average assessment per front foot . . .	\$1.62
Per cent. of cost assessed . . .	65.4%

Sewer assessments have been made by this division for the year ending January 31, 1894, to the amount of \$113,-469.57, as follows :

In accordance with Chap. 456 of the Acts of 1889, as amended by Chap. 346 of the Acts of 1890	\$5,916 44
In accordance with Chap. 402 of the Acts of 1892	107,553 13
	<hr/>
	\$113,469 57

Bills for sewer assessments have been deposited with the City Collector for collection to the amount of \$121,699.41. This sum is made up of all the assessments levied during the year under the Acts of 1892, and the bills for those estates assessed under the Acts of 1889-90, from June, 1889, to January 31, 1894, that have been connected with the public sewers during the year, and which amount to \$14,-146.28.

There remain on the books of this division at 5 per cent. interest the sum of \$40,548.26, representing the assessments made under the Acts of 1889-90 for those estates which have not been connected with the sewers for which they were assessed, and bills for which will be deposited for collection as the connections are made. This sum represents 30.6 per cent. of the total assessments made under those acts.

Entrance fees to the amount of \$6,882 have been collected from estates upon which no sewer assessment was ever levied, in accordance with Chap. 36, Sect. 10, of the Revised Ordinances.

Two thousand and seventy-nine permits have been issued to drain-layers to connect house-drains with the public sewers, or to repair old connections; and the work done under these permits has been inspected and a record of same made on the plans of this division.

STREET-CLEANING DIVISION.

The work of the Street-Cleaning Division consists of the sweeping and cleaning of paved streets, the scraping and cleaning of gutters and macadamized roads, and the patrolling of streets by a cart and a push-cart patrol to gather up papers and other unsightly materials that have been carelessly thrown into the streets.

For the convenience of operation the city is divided into nine (9) sweeping districts, as follows :

STREET-SWEEPING DISTRICTS.

District No. 1. — West End.

This district includes that portion of the City Proper that is bounded on the west and north by the Charles river, on the east by Charlestown and Washington streets, on the south by School and Beacon streets and Boston Common.

District No. 2. — North End.

This district includes that portion of the City Proper bordering on the Charles river and harbor front that lies east of Charlestown and Washington streets, and north of Central and Milk streets.

District No. 3. — South End.

This district includes the southerly portion of the City Proper (business section), and is bounded on the north by Central and Milk streets, on the east by Fort Point channel, on the south and south-west by Kneeland, Lincoln, Harvard, and Utica streets, and on the west by Washington street.

District No. 4. — South End.

This district includes the portion of City Proper and Back Bay that lies southerly from the Public Garden and Common, and extends as far as Dartmouth and Dover streets, and is bounded on the west and north by Beacon and School streets, easterly by Washington, Kneeland, Lincoln, Howard, Utica streets, and Fort Point channel, southerly by Dover, Berkeley, Columbus avenue, and Dartmouth streets.

District No. 5. — Back Bay and South End.

This district includes all of Back Bay and South End between Charles river and South bay from Dartmouth and Dover streets on the north, to Massachusetts avenue, Hammond and Hunneman streets on the south.

District No. 6. — South Boston.

District No. 7. — Roxbury.

District No. 8. — Brighton.

District No. 9. — East Boston and Charlestown.

These districts each contain approximately 200,000 square yards of paving (stone, brick, or asphalt), and also from 2,000 to 129,000 square yards of paved gutter surface on macadamized streets.

Depending on the character of the district, the pavements are swept and cleaned from two to six times per week.

The force to clean paved streets is practically adjusted on the basis that a double sweeping-machine covers 51,000 square yards of surface in nine hours, and, depending on the number of square yards in the district, and on the number of times per week the district is swept, the number of men and sweeping-machines is adjusted.

The force and plant assigned to a district usually consists of a foreman, two sub-foremen, sixteen sweepers (who broom up into heaps the windrows of dirt swept into the gutter by the machines), six helpers (who together with the teamsters load the teams), six teamsters, one dump-man, one water-cart driver, and three sweeping-machines.

Owing to the constant growth of Dorchester and West Roxbury the work done by occasional visits of sections of gangs from the adjoining districts was no longer sufficient; but, on account of the small appropriation, no additional force could be organized. These districts, however, are constantly cared for by the paving division force, thus saving the expense of extra superintendence and headquarters.

The following table shows the average force employed during the year:

District.	Average No. men employed.
Office	4
1, West End	33
2, North End	33
3, South End	33
4, South End	32
5, Back Bay	30
6, South Boston	32
7, Roxbury	29
8, Brighton	8
9, Charlestown and East Boston	25
Yard and stable	14
Push-cart Patrol	40
Total	313

The above-mentioned force use in carrying out the work of the division the following plant :

Fifteen double sweeping-machines, 10 single sweeping-machines (1 transferred to Paving Division), 10 water-carts, 83 street-carts, 84 horses (owned by the division), 21 asphalt-scrapers.

The Push-cart Patrol use :

Fifty-nine push-carts, 49 extra barrels, 3 street-carts (steel), 3 horses (all hired). Of the 59 push-carts, 38 are in daily service.

In addition to the above-mentioned carts, the division hires about 25 extra teams.

PUSH-CART PATROL.

The working of the Push-cart Patrol has been quite satisfactory, and the results have been so gratifying that the number has been increased during the year. Forty men are now employed in this service, and the area covered comprises the following-named streets :

Arch street, Avon place, Beach street (Washington street to South street), Beacon street (Arlington street to Charles street), Bedford street, Blackstone street (Hanover street to Cross street), Boylston street (Washington street to Arlington street), Bowdoin square, Brattle street, Brattle square, Bromfield street, Bulfinch street (Howard street to Bowdoin square), Causeway street (Merrimac street to Beverly street), Central street, Chardon street, Chauncy street, Columbus avenue (Park square to West Chester park — now Massachusetts avenue), Congress street (Milk street to State street), Congress square, Cornhill, Court street, Devonshire street, Doane street, Eliot street, Elm street, Essex street (Washington street to South street), Exchange place, Federal street (Summer street to Milk street), Franklin street (Washington street to Federal street), Friend street, Hanover street (Scollay square to Blackstone street), Harrison avenue (Bedford street to Kneeland street), Hawkins street, Hawley street, Haymarket square, Harvard street, Kilby street, Kingston street, Kneeland street, La Grange street, Lincoln street, Mason street, Merrimac street, Milk street (Washington street to Broad street), Otis street, Park square, Portland street, Post-office square, School street, South street, State street (Washington street to Broad street), Sudbury street, Summer street, Temple place, Travers street (Merrimac street to Beverly street), Tremont street (Eliot street to Court street), Tremont row, Union street (Hanover street to Haymarket square), Washington street (Kneeland street to Haymarket

square), Water street, West street, Winter street, Winthrop square, and the following asphalt streets :

Beacon street from Dartmouth to Massachusetts avenue, W. Newton street from Washington to Columbus avenue, Chester square, south side, from Washington to Columbus avenue, Chester square, north side, from Tremont to Columbus avenue, Broadway from Dorchester avenue to Dorchester street.

The contents of the barrels collected by the Push-cart Patrol are removed at regular intervals by odorless iron dumping-carts. This cart does not leak, is easily dumped, and has proved of good service in the work of collecting the contents of the barrels.

The refuse collected by the patrol is taken to the dumping-scow and towed to sea. The refuse has considerable value as manure, but the extra cost of teaming it to the railroad stations, where it could be sold to farmers, and the difficulty of making arrangement for cars, prevent the division from disposing of it in this manner.

Three thousand nine hundred and seventeen loads of street-sweepings were collected by the Push-cart Patrol.

The following table shows the number of loads of street-sweepings removed each year during the last twelve years :

Year.							No. of Cartloads.
1882	.	.	.	.	.	.	52,381
1883	.	.	.	.	.	.	58,272
1884	.	.	.	.	.	.	62,222
1885	.	.	.	.	.	.	61,455
1886	.	.	.	.	.	.	59,875
1887	.	.	.	.	.	.	68,990
1888	.	.	.	.	.	.	68,010
1889	.	.	.	.	.	.	70,476
1890	.	.	.	.	.	.	70,449
1891, 12 months	.	.	.	.	.	.	187,113
1891, 13 months	.	.	.	.	.	.	291,425
1892	.	.	.	.	.	.	³ 106,829
1893	.	.	.	.	.	.	⁴ 110,496

A large number of permits are yearly issued to store-keepers and venders for the purpose of allowing them to sell during the summer time goods from their basements or first-story windows to people on the street. These permits are required under the ordinances of the city of Boston, which

¹ Jan. 1, 1890, to Jan. 1, 1891.

² Jan. 1, 1890, to Feb. 1, 1892 (date made necessary by the change in the financial year).

Of this amount 4,290 loads were collected by the Push-cart Patrol.

³ " " 3,456 " " " " " "

⁴ " " 3,917 " " " " " "

provides that no person shall so sell without a permit from the Superintendent of Streets.

As the privilege is a valuable one, given without compensation, and as it is largely obtained for the purpose of selling fruit, the refuse from which is almost immediately thrown into the street, the department issued the following letter :

STREET DEPARTMENT,
CITY OF BOSTON, 1893.

DEAR SIR: Complaint having been made of the condition in which the street is kept in front of your premises, where you are doing business under a permit obtained from the Street Department, you are hereby notified that it will be necessary for you to procure a waste-barrel, to be located in the immediate vicinity of your stand. In order that these barrels may be of uniform dimensions, color, and lettering, you will be obliged to purchase the same of the city of Boston. Application for one of these barrels must be made to Mr. P. A. Jackson, Deputy Superintendent of the Street-Cleaning Division, at his office at 14 Beacon street, within ten days from date.

Yours truly,

H. H. CARTER,
Supt. of Streets.

Acting under these directions, eighty-nine barrels were applied for and placed in front, or in the immediate vicinity, of various fruit-stores, where they would obstruct the sidewalk as little as possible, at the same time being conspicuous enough to attract attention and to invite the depositing of any refuse which might otherwise be thrown into the street.

A sign was placed on each barrel, reading as follows :

PUBLIC WASTE BARREL.

PLEASE PUT RUBBISH IN THIS BARREL AND NOT IN THE
STREET.

The contents of these barrels were regularly collected by the same force attending to the push-cart barrels.

The experiment was very satisfactory, as the barrels became filled in from one to five days. The number will be increased this summer.

Attention has been directed to the subject of public slovenliness, both by numerous communications to the public press and by editorials during the past year. The following editorial taken from a leading daily paper expresses this subject clearly :

"PUBLIC SLOVENLINESS.

"An American who was recently in Berlin relates that one day, in walking about the city, he chanced to have a bit of

waste paper in his hand. His first impulse was to fling it into the street. At home he would have done so. 'But,' said he, 'as I looked at the pavement, I was struck by its cleanliness, and I would as soon have thought of littering the parlor floor in a house where I was a guest.' It is a pity that our Boston public cannot be as regardful of the proprieties of out-door conduct. Our City Government is now caring for the streets as never before, and the attention given to their appearance is the subject of universal remark.

"But it is hopeless to expect to keep them in the thoroughly neat condition that might otherwise characterize them so long as the public persists in its present slovenly habits. These are generated by years of slovenly streets, but now that the city is at such pains and expense in the matter, it is time that people learned to respect their appearance. The most of the litter that now disfigures the pavements is cast into the street by persons passing along the sidewalks. They fling banana skins and orange peelings into the thoroughfare to the peril of their fellows, they tear paper into bits and scatter it broadcast, and carelessly throw away circulars, newspapers, envelopes, paper bags, etc. This is all clearly forbidden by the city ordinances, and it is time the police began to enforce them. The police are not doing their duty in this respect. Whether or not it is because they are not amenable to the city authorities, it is difficult to say, but there is a common impression abroad that, if the Mayor had the power to make his word felt in this matter, there would very soon be a different aspect of things.

"If it is true that the police authorities are purposely not as active in this respect as they should be, lest too much credit be given the present administration, then they are only hastening the day when the existing form of police control shall come to an end. This piggish abuse of the streets would soon terminate should there be a few dozen arrests, and a few hundred admonitions to persons guilty of such violations of the ordinances regulating the care of the streets."

While this agitation has had some effect, there is still much to be desired, and the following quotation from the New York report on street-cleaning puts the subject in its true light:

"It is a hopeless task to keep the streets of this city clean so long as the people themselves are determined to keep them dirty."

THE SMOKE NUISANCE.

In view of the progress that Boston has made in the improvement and development of its water-supply, and in the creation of a sewerage system more complete and perfect in its operation than is to be found elsewhere in this country, and in view, too, of the endeavors to purify the city throughout, and to give to the public the free and unobstructed use of clean and wholesome streets, with solid pavements and comfortable sidewalks void of all refuse, unsightly waste and dust, it is not strange that public attention is called to the condition of the air, laden as it is with soot, cinders, and gaseous compounds that are being belched forth without let or hindrance from numerous stacks located within the business limits of the city, or close to the windows of stores or residences.

That smoke is a nuisance, detrimental to the exterior of buildings, to merchandise, and household goods, and to public health as well, is an established fact that needs no proof.

The chief incentives toward the banishment of such a nuisance appear to be :

1st. The excessive cost of repairing the damage caused by soot.

2d. The increased death-rate due to lung, bronchial, and kindred diseases.

3d. The lowering of the standard of cleanliness in the defacement of landscape.

4th. The general discomfort and depression of spirits which a murky atmosphere produces.

As a philanthropist and practical engineer has said :

" When we consider how closely cleanliness is allied to godliness, how largely civilization consists in the removal of the dirt, and the suppression of the nuisances which characterize savage life, and the fact that its power to purchase comfort is that which gives to money its value, the subject takes on a higher aspect, and becomes one of first importance."

The smoke problem, although comparatively new in Boston, has received considerable attention in other large industrial cities for many years, where various types of bituminous coals are used in large quantities for generating steam. While it is a well-known fact that the fuels used in Boston, as a general thing, produce less offensive smoke and in less quantities than other cities, where a larger proportion of soft

coal is necessarily used in the interests of economy, it still remains an undoubted fact that dense, black smoke is emitted in large volumes in places where its effect is very apparent, and from which numerous complaints arise as to the injury to merchandise and other goods with which it comes in contact.

The tendency to change from the use of hard coal to a softer quality containing more sulphur, iron, and other organic smoke-producing elements, is on the increase, both on account of the high price of hard coals due to enormous freight rates, and also on account of the acknowledged higher steaming capacity of soft coal.

It is certain that we are getting more and more smoke every year, and unless some radical steps are taken to check this increase, it is difficult to predict to what extent we may be obliged to suffer on account of such neglect.

The history of the movement in Boston so far is very brief. Previous to 1892 no regulations were in existence other than the general rules framed for the guidance of the Inspector of Buildings, having no special reference to smoke consumption.

An ordinance was first adopted on the 7th day of May, 1892, prohibiting the use of bituminous coal for the generation of steam, unless the furnace be provided with "some effectual device for consuming smoke." This was followed by an order instructing the Inspector of Buildings to enforce this regulation.

As that official set the standard efficiency of smoke-consuming devices at 90%, and as coal consumers were not informed as to existing devices for its prevention, and were uncertain as to the exactions of the ordinance in detail, a public meeting of the owners of boiler plants and others interested was held September 16, 1892, at which a committee was appointed to look into the whole matter and report. This committee was instructed as follows: "*Voted*, That a committee of three be appointed by the Chair to make such investigations as they may deem necessary to ascertain the relative merits and expense of various smoke consumers and other devices on the market, and what measures have been taken in other cities to decrease the amount of smoke emitted; and the committee is further authorized in their discretion to confer with the Mayor and the City Government as to the advisability of a commission to investigate the subject."

The report of this committee was submitted by His Honor Mayor Matthews to the City Council, April 7, 1893, and is given in full in City Document 81, 1893.

It shows that an examination was made of some forty-eight devices, and their use inspected in various cities, but does not state definitely "the relative merits and expense of various

smoke consumers and other devices on the market," nor does it state explicitly the results of any tests made by it, or the results obtained in other cities.

It does contain general information of value on its findings, and its conclusions suggest a form of statute afterward adopted, together with the following significant paragraph: "The important fact remains that with good firing and good draught, the average furnace can be run without the necessity of a smoke consumer to avoid the creation of a nuisance."

As this committee were not justified in assuming any great expense, extensive experiments with the various types of devices were not undertaken, but from their investigations they were enabled to classify these types, and gave a brief description of each of four types mentioned. Doubtless much other information from plans and descriptions were received by the committee, which was not included in their report.

As an outcome of this report, a bill was introduced into the Legislature, passed and approved May 15, 1893, limiting the amount of smoke so that at least 75% of all smoke should either be consumed or otherwise prevented from entering the atmosphere, and authorizing the Mayor to designate some proper person from among the city officials who should be charged with its enforcement. In accordance with this provision, His Honor N. Matthews, Jr., Mayor, designated on June 14, 1893, Henry H. Carter, Superintendent of Streets, as the official to be charged with the enforcement of this act, and in January, 1894, his appointment was continued for the ensuing year.

Measures were at once taken to ascertain the location of the principal soft-coal users producing an objectionable amount of smoke, and the following circular was served upon the owners of the building where complaints from any sources had been received:

CITY OF BOSTON, STREET DEPARTMENT,

BOSTON, August 14, 1893.

DEAR SIR: I desire to call your attention to Chapter 353 of the Acts and Resolves of 1893, which reads as follows:

[CHAP. 353.]

AN ACT TO ABATE THE SMOKE NUISANCE IN LARGE CITIES.

Be it enacted, etc., as follows:

SECTION 1. In cities of over three hundred thousand inhabitants no person shall, after the first day of July in the year eighteen hundred and ninety-three, use bituminous coal for the purpose of making steam in boilers in any building, unless the furnace in which such coal is burned is so built, managed, arranged, or equipped that at least seventy-five per cent. of the smoke from said coal is consumed or otherwise prevented

from entering the atmosphere, the degree of suppression being determined by the quantity of such smoke emitted, as shown by the density and color of the issuing smoke and the length of time which it is visible, the maximum standard of comparison being a continuous discharge of dense, dark smoke during the time the furnace is in active operation.

SECT. 2. The mayor of any city to which this act applies shall, within one month from its passage, designate some proper person from among the city officials who shall be charged with its enforcement; and such designation shall thereafter be made annually in the month of January, but shall be subject to change at any time.

SECT. 3. Whoever violates any provision of Section 1 of this act shall be punished by a fine of not less than ten nor more than one hundred dollars for each week during which such violation shall continue. [*Approved May 15, 1893.*]

In accordance with the provisions of the above act, the Mayor of Boston has designated the Superintendent of Streets as the official to be charged with enforcement of the act.

Complaint has been made that smoke from the chimney on your premises is emitted in violation of this law, both as to quantity and density.

This department has no special smoke-consuming apparatus to recommend, and is not prepared to advise you in respect to the method of remedying this nuisance. It is possible that the chimney is of insufficient capacity for your boiler plant, which fact could be ascertained by consultation with some competent mechanical engineer.

You are hereby notified that immediate steps must be taken by you to provide some arrangement whereby seventy-five per cent. of the smoke produced is consumed, as required by law.

Yours truly,

H. H. CARTER,

Superintendent of Streets.

A temporary inspector was employed to gather further information as to the kind, size, horse power of boilers, heating surface, grate area, area of smoke and chimney flues, height of chimneys, amount of coal burned daily summer and winter, the percentage of air space in and above grates, and the device for smoke prevention in use or contemplated, etc. These detail reports have been critically examined and approximate deductions made therefrom.

During the year 129 notices upon soft-coal burners have been served and 115 complete inspections made.

These inspections show that —

23 plants are supplied with a patent smoke-consuming device ;

4 are provided with " wing walls," a device not patented ;

12 are using hard coal ;

4 are using mostly shavings for fuel ;

13 are considering the adoption of some device ;

4 are supplied with device of their own design ;

7 are ready to adopt a device when one is found that will satisfy the demands of the statute, and do economic work, while 48 claim that they are complying with the law at present.

Some claims are made that a compliance with the law is effected by the use of a mixture of soft and hard coal screenings. The use of hard coal alone is an infallible remedy, as the law applies only to soft coal.

The following defects in arrangement of plant were apparent from inspection :

Chimney too small	37 cases.
Air space in grate too small	20 “
Smoke-flue small	8 “
Number of tubes small	1 case.
Forced at times, especially in winter	24 cases.

Several boilers are forced above their rated capacity, especially those furnishing power for electric-light dynamos, at the hour when the lights are turned on. Many of the most serious smoke nuisances in this city are caused on this account.

In a few cases the height of boiler above the grate was found to be small, which should not be less than 21 inches for boilers 4 ft. in diameter, 24 inches for boilers 5 ft. in diameter, and 27 inches for boilers 6 ft. in diameter.

In some 37 cases examined, while the arrangement of the plant was not open to severe criticism, and the relation of the area of grate to that of the smoke and chimney flues was apparently proportional, the smoke produced might have been due either to a poor quality of fuel or to careless and indifferent firing.

The following circular-letter was sent to certain offenders, where the inspection seemed to show a well-arranged plant that should, under careful manipulation and with good fuel, be free from offensive smoke :

CITY OF BOSTON,
STREET DEPARTMENT, BOSTON, ———, 1894.

DEAR SIR: From an inspection of your premises with reference to complying with the requirements of the law in regard to the smoke nuisance, it is found that your stack, at times, gives forth an unwarrantable amount of dense, black smoke. While the general dimensions and proportions of your boiler plant appear to be properly adjusted, yet from some cause unknown, complete combustion does not ensue.

This may be due to one of three causes: first, the character of the fuel used may not be of the right standard; second, it may be due to the carelessness and indifference of the firemen employed; or third, to a lack of some device or expedient whereby the gases are retained in the combustion chamber long enough to attain the required heat necessary for complete combustion.

Your careful attention is, however, invited to the quality of the fuel used, and you are hereby cautioned against the use of cheap and inferior grades of sulphurous coal, which must require the most extraordinary conditions as to draught, arrangement of grates with regard to removal

of clinkers, etc., as such coals never show a quick and easy capacity for development of steam.

The necessity of employing a more reliable and intelligent fireman than is often found in charge of such work cannot be called too emphatically to your attention. The substitution of any extra or miscellaneous help in place of a man especially trained for this purpose is to be deprecated as well from the point of economy as from the greater liability to produce a smoke nuisance.

The following simple rules in regard to firing are often overlooked:

INSTRUCTIONS FOR FIRING BOILERS WITH BITUMINOUS COAL.

1. All large coal should be broken up so that the largest pieces are no greater than a man's fist.
2. Begin to charge the furnace at the bridge end, and keep firing to within a few inches of the dead plate.
3. Never allow the fire to burn so low, before a fresh charge is thrown in, that there shall not be at least three to four inches deep of clean incandescent fuel on the bars, and equally spread over the whole grate.
4. Keep the bars constantly covered, particularly at the sides and bridge end where the fuel burns away most rapidly.
5. If the fire burns unequally, or in holes, the vacant spaces must be filled up.
6. Under ordinary conditions the thickness of fire will vary from four to eight inches for different amounts of draught and rate of combustion. The best thickness to carry must be determined for each case, bearing in mind, however, that a very thick fire is conducive to smoke production.
7. The greatest preventive of smoke is frequent firing of small quantities on alternate sides of the furnace.
8. With a battery of boilers, one boiler must be fired at a time on one side of the furnace only, then the next boiler in the same manner, and so on to the end; then beginning again with the first boiler, fire the other side of the furnace, and so on down through the battery.
9. If there are no other means of admitting air than through the grate and at the fire door, the register in the fire door should be left open after firing, and if the boilers are forced, it should be left open all the time.
10. With a shallow ash-pit the ashes should be removed frequently to allow free inlet for air, and to prevent burning the grates.

By calling the attention of your firemen to the above instructions, it may be possible that you will be able to reduce the quantity of smoke emitted so that there shall be no further cause for complaint. If you are unable to reduce the smoke the proper amount by this means, it will become necessary for you to adopt some one of the effective devices now in use in this city and elsewhere for this purpose, the selection of which must be determined by your local conditions and the nature of the work demanded of your particular plant.

If you are guided in such selection by a competent mechanical engineer who understands the peculiar needs of your individual case, you will doubtless be saved any unnecessary expenditure of money, and arrive at the results desired without loss of time.

It is desirable that you give this your immediate and continued attention, to the end that the emission of smoke may be entirely done away with, and the department awaits the development of future inspection.

Yours truly,

H. H. CARTER,

Superintendent of Streets.

Doubtless the above simple instructions for firing will tend largely to a reduction of smoke, if carefully and constantly followed up.

No matter what style of combustion chamber is used, or what device for smoke prevention is added thereto, if an irresponsible and careless fireman is employed, no good results can follow. In many cases, where a proper device was in place, the inspector found that the fireman had neglected to use it through sheer laziness.

The 23 patented smoke-preventing devices examined represent the following well-known types, having been experimented with here and elsewhere for a number of years :

1st. *Down-draft Furnaces.* — In this form the back of the fire-place is closed so that all smoke and volatile matter must pass downward through the fire bed. This closure is effected either by a water-leg passing below the level of the grate, or by a drum, set below the level of the grate and connected with the boiler at either end by tubes, with the space between the drum and the boiler shell bricked in solid.

For the ordinary grate bars are substituted a water-tube grate connected at the back with the water-leg or drum, and at the front by means of headers and connecting tubes with the boiler shell, thus adding to the heating surface of the boiler.

This is considered a most rational form of combustion, as the fresh coal and fresh air are both applied and admitted on the top and cooler part of the bed, while the gases are all made to pass through incandescent coke below. The claim is made "that the moisture of the coal and the combined water of the volatile matter are decomposed into hydrogen and carbon monoxide gases which, with the aid of additional air supplied below the grate, burn with useful effect, while the separated carbon disappears into invisible carbon dioxide gas."

With moderate firing the loss of fuel from falling through the grate is very slight. One form of this type introduces a second grate some distance below to catch the glowing coals which do drop through, and through which air is admitted as in the ordinary manner. Fresh coal is never applied to the lower grate, so that the incandescent fuel falling from above the space between the two grates is in a favorable condition for completing the combustion, being highly heated and supplied with heated air. Such a system is well adapted to ensure a good smoke record even when the fire is forced, or careless firing exists.

The objections to this type arise principally from the defects at the joints and connecting pipes, where there is an

unusual strain, and also at the water-leg or drum, where the heat is intense, so that, with impure or dirty water, a tendency to scale is shown on the lower surface of the drum. Notwithstanding these objections (which have been largely obviated in recent designs), it gives great promise for the future, and is well worth attention and study.

Examples of this type, with a singlegrate called the "American Down-Draft Furnace," may be seen at the following places :

Nevins Estate, 78 Chauncy street.

Lyceum Theatre, Washington street.

Nevins Estate, 66 Chauncy street (with lower water-grate).

The other form supplied with a second ordinary grate, and called the "Hawley Down-Draft Furnace," may be seen at

The Brookline Gas Light Co., Allston.

Also at the West End Power Station, Cambridge.

An elaborate test of this device has been made by the St. Louis Smoke Commission, composed of mechanical experts, which shows that in comparison with a common furnace, the Hawley furnace emitted 70 per cent. of smoke as a maximum, but this occurred only three times during the day, averaging less than a minute at a time, while the common furnace emitted 100 per cent. 68 times during the day with an average duration of four minutes, and aggregating 45.5 per cent. of the whole time of test.

In addition to the prevention of smoke, the report gives credit to this furnace for merit in the following points :

(a.) Increase in evaporation of 24.54 per cent.

(b.) Utilization of calorific power of coal showing increase of 21.08 per cent.

(c.) Increase in horse-power developed of 11.25 per cent., due principally to increased heating surface.

(d.) Convenience of attachment.

The cost, for ordinary tubular boilers, varies from \$550 for a 48-inch boiler to \$850 for an 84-inch boiler, and for water tube boilers from \$600 for 100-horse power to \$1,750 for 500-horse power, showing that this type is more adapted to the larger and more expensive plants.

2d. *Steam Jets*. — The principle of steam injectors is to supply air, either fresh or heated, in such a manner as to form water gas by the decomposition of steam. They are applied at different points of the boiler in different devices, either at the side-walls or over the fire-doors, or at the bridge-wall. They work satisfactorily in boilers where the demands are light, but require careful firing; and again, if not properly set and adjusted, there ensues a blow-pipe action upon the boiler

shell or grate bars, which leads to a rapid burning out of the metal.

With ample boiler capacity and faithful and efficient firemen satisfactory results may be obtained where steady service is required from the steam jet; it must, however, be turned on at each firing, or its efficiency soon becomes impaired.

Being comparatively inexpensive, it is well adapted to small plants.

This type is exemplified by the Standard Smoke Consumer Company, and may be seen in operation at the Grand Hotel, 417 Columbus avenue; Estes estate, 196 Summer street; Jordan, Marsh, & Co. (wholesale), corner Bedford and Lincoln streets.

From a mechanical standpoint, it may be said that the principle upon which this device works is that of admitting to the furnace above the fire a mixture of superheated steam and air, the steam being blown in at boiler pressure or less, and the air being induced by the natural draught and by suction caused by the injection of the superheated steam.

Steam is taken from the boiler or main steam-pipe and passed through the super-heating coil of $\frac{3}{4}$ -inch pipe which is in the brick setting at the side of the furnace, with one course of brick between it and the fire. The amount of steam which passes through this coil is regulated at will by a valve. The steam escapes into the furnace through nozzles which are made by screwing an ordinary plug into a reducing coupling, this plug having been drilled through the centre and slotted on the sides to form channels for the steam to escape.

Air is admitted through pipes which are $2\frac{1}{2}$ inches in diameter. These pipes connect with cast-iron boxes, and in these boxes the nozzles are located.

In small boilers two nozzles are placed over the fire-doors. In large boilers, in addition to those over the fire-door, are two nozzles on each side of the furnace.

For the prevention of smoke it is necessary to admit air enough to produce complete combustion. It is of no importance where the air is admitted provided the mixture of air and gas is continuously affected before the temperature is too low for ignition of carbon, or not under 800° Fahrenheit.

This apparatus brings into the furnace above the fire an additional supply of air, and the escape of the superheated steam through the various orifices causes the air to get thoroughly mixed with the gases and thus assists in their combustion; that it very much lessens the smoke produced there is no doubt.

It also is of benefit in many places, in increasing the

draught, and making it possible to get more work from the same boilers.

In the plants visited in this city the device seemed to be giving very good results, especially in enabling them to do more work without increasing the number of boilers.

3d. *Automatic Stokers.* — The feature of this type is the use of mechanical firing by means of screw or hopper feeders to fixed inclined grates or to movable inclined or step grates. "Nut," "pea," or "slack" grades of coal must be used, excluding "lump coal" and the "run of the mine." Regular feeding does away with periods of heavy smoke development at time of firing. They require that a coal be used which does not readily coke and does not clinker to any serious extent. Mechanical stokers with natural draught reduce the capacity of the plant; on this account it would be impossible to introduce them into plants which are now insufficient in capacity. They are effective smoke preventers.

It involves laborious firing to clean an inclined or step grate, and the tendency is towards neglect. It is not adapted where caking or hard clinkering coals are used, or where plants are apt to be overworked.

In these devices mud and scale will more readily settle at points that are covered or obscured from the eye of the fireman or engineer, increasing the danger. With pure feed-water, no trouble should ensue. Examples are found in the Roney Stoker, the Murphy Furnace, and the Jones Under-feed.

The former may be seen at the State House Extension, and at the Boston Electric Light Co.'s plant, Boston Street, Dorchester; also, at the manufacturing establishment of Curtis, Davis, & Company, Cambridgeport, may be seen a fine sample of a modern boiler plant, provided with four Roney stokers, and an ingenious system for elevating and conveying the coal, distributing it into bunkers, supported on iron girders in front of and above each boiler.

This stoker furnishes a continuous supply of coal to the furnace at a slow and uniform rate of feed, being operated by one small engine set at the end of a battery of four boilers. The action of the stoker is first to liberate the free gases and partially coke the coal on a dead plate, underneath the coking arch in connection with an indraft of hot air through perforated channels in the fire-brick tile. The coal is then slowly worked down over rocking grates into the hottest portion of the fire, and when consumed, the ash and cinder, falling on the dumping grates, is dropped into the ash pit, from which it is carried by means of a screw conveyor into a bin at the end of the building and there dis-

charged into carts. The chief advantage of this type is that it ensures a steady rate of combustion, does away with the periodical lowering of the temperature and consequent loss of efficiency, caused by hand firing (which, in some cases, is of marked irregularity), and reduces the work of the fireman to watchfulness and supervision without any violent manual labor. Such regularity of duty may incidentally add to the life of a boiler.

4th. *Furnaces with Hollow Walls.* — Arranged for the admission of heated air.

There is, probably, a larger variety of this type than of any other class, except, perhaps, the steam jet. In some forms, the air is passed through tortuous ducts and hollow passages left in the brickwork of the boiler settings, and is admitted above the grate through slots or round openings at the sides of the furnace or at the bridge wall. This style is open to objection in many cases, on the ground of instability, and lack of durability, due to the clogging up of the opening for the admission of air, through lack of proper attention.

Notwithstanding these defects, the necessity of admitting more oxygen at a proper temperature for combustion with the gases that tend to escape unconsumed, has led to much experiment, the result of which has been to simplify the device, strengthen the setting, and to increase the evaporation. For samples of this type, the Jones Economic Furnace can be seen at the

Boston Electric Light Plant, Gilbert place.

Boston Lead Works, Hampden street.

Boston & Maine R.R., Minot street.

Scrannage Bros. & Co., 48 Beverly street.

The device of the Bacon Engineering Company can be seen at the Youth's Companion Building, where public inspection of regularly conducted mechanical tests has been offered by the proprietors to students of Harvard College and the Mass. Institute of Technology, and others specially interested.

The "Jarvis Setting" can be seen at the Edison Illuminating Company, at Atlantic avenue, and Edison Illuminating Company, Head place.

The demands on the latter plant are so excessive in the early evening that the device does not work to advantage, and until a better distribution of duty is arranged, by additional feed services from the other plant, this plant cannot be expected to give good satisfaction.

5th. *Coking Arches of Firebrick or Steel.* — In this device the arch is placed over the forward part of the fireplace, with the chamber above and over the fresh coal charged, where

the greater part of the volatile matter is drawn off. The resultant coke is then pushed to the rear to serve as a hot-bed over which the volatile matter from the fresh coal in front is made to pass. Arch structures are reported as usually short-lived, being exposed to high and changing temperatures, require expensive repairs, and cause annoying delays in the operation of plant.

Many other arrangements have been tried, such as the introduction of "wing walls" of various patterns; "the hollow grate-bar" discharging hot air back of the bridge wall, and the use of "double combustion chambers," where the two fires are charged alternately. In the latter, suitable arrangements are made to pass the gases and smoke from one fire freshly charged, beneath and through the other fire-bed, which is in a state of glowing coke; or the gases may be passed through a single fire-bed a second time by means of a fan blower. Both are open to objection as requiring extra room or extra skilled attention.

As to the merits or demerits of the various smoke-preventing devices, as shown by methodically conducted experiments, this city has never taken the necessary steps to determine. No appropriation has ever been set apart for conducting mechanical tests, to determine to what extent the reduction of smoke can be carried and show economy.

Other cities are doing this to a large extent, and useful information is being made public.

Perhaps the most interesting and complete results have been reached by the commission of skilled experts now organized in St. Louis. Officially, they have made a public report on three devices, which have been indorsed after most thorough and complete tests, viz. :

1. The Improved Zigzag Grate-Bar and Smoke-Preventing Co.'s Device, or the Boileau Device.
2. The Hawley Down-Draft Furnace.
3. The Standard Smokeless Furnace.

All three receive a favorable endorsement, and the special advantages of each are amply set forth in their report, which is a public document. Their reports contain, also, an analytical statement of the principles and reactions upon which combustion depends, showing the chemical process by which the pure carbon is set free, which makes the visible smoke; also a discussion of the various fuels in use, their relative cost, etc., all from a local standpoint. One report concludes with a form of ordinance recommended as practical, and the suggestion that an authoritative and impartial determination should be made. The ordinance suggested has been adopted with a few modifications, and is now in successful operation.

The Hawley Furnace is the only one of the three that is in use in this city and vicinity. The most extensive experiments here have been made and are now in progress at the West End Power Plant in Cambridge, conducted solely by private parties.

The American Down-Draft Furnace, which is somewhat similar to the Hawley, seems to be meeting with good results, especially since the recent introduction of a lower water-grate.

From all the facts now apparent, these two furnaces are the only two that show good steaming capacity, *with inferior fuel*, and which are at the same time successful smoke-preventers.

REMEDIES WITHOUT USING A DEVICE.

In many cases it is possible to abate the smoke nuisance without reverting to a so-called patent device.

This may be accomplished effectually as follows :

1st. By the adoption of "smokeless fuels."

2d. By the adoption of electricity as a motive power.

3d. By special care and attention to the manner of firing.

The use of "smokeless fuels" is a most valuable remedy for the smoke nuisance, for the reason that the duty required of some boilers and heating furnaces is such that this change could be effected with little inconvenience and not excessive cost.

The smokeless fuels are (a) anthracite or hard coal, (b) coke, a smokeless and almost flameless fuel, (c) coal or retort gas, (d) water gas, (e) natural gas, (f) petroleum oil (nearly smokeless).

The general consideration against the adoption of the above fuels, except for heating and industrial purposes, has been their excessive cost, which for evaporating a given weight of water has proved much greater than if soft coal were used. Constant experiment, however, has led to economy in the manufacture and distribution of coke and gas, which will undoubtedly result in their more general use. It is computed that, when gas can be sold for 75 cents per 1,000 cubic feet, it would come very near to competition with soft coal.

The outlook for a reduction in the cost of petroleum oil is still more promising. Oil can be delivered in St. Paul at such a price that its use for power purposes equals in cost that of coal at \$3.00 per ton. If delivered by pipe-lines, a still greater reduction is effected.

We may look for surprising results within the next few years in the development of economy in the use of the above-mentioned fuels.

The gas-engine is receiving a great deal of attention, and

is very efficient. For intermittent power, it is very satisfactory. The petroleum engine will soon receive greater attention.

Electricity is also making rapid strides in this direction. It is particularly adapted to small plants not requiring "live steam," or steam for other purposes than power.

The limit of horse-power under which electricity can be used to advantage varies under different conditions, but it can be used profitably to a considerable amount of power under favorable conditions, and, of course, does away with all smoke.

From experiments that are being made abroad, it has been discovered that the carbon particles held in suspension in smoke can be thrown down by electricity, and deposited instantly upon electrocized plates, ingeniously arranged with proper insulation. This discovery may lead to a practical device for reducing smoke.

GENERAL REMARKS.

The enforcement of the present law in the city of Boston has made apparent several practical defects. In the first place, there is difficulty in determining the exact per cent. of smoke emitted.

The law reads that 75 per cent. *of the smoke from the coal* must be consumed or prevented, and then adds that the "maximum standard" should be "*a continuous discharge of dense, dark smoke*, during the time the furnace is in active operation."

This is equivalent to allowing that for one-fourth part of the time the furnace is in operation, a continuous stream of dark dense smoke would be permissible, provided that during the remaining time it is of medium density and color.

As a matter of fact, much of the light-gray smoke is as injurious to fabrics as the dense dark smoke. The simple injection of steam into the stack will change the color of the smoke, and perhaps clear the law, but will not get at the heart of the nuisance, nor would it effect combustion.

The law should lean toward *complete combustion*, regarding smoke as only the visible sign of *incomplete combustion*, which really creates the nuisance. It matters not whether the small particles of carbon floating off are jet black, dark-brown, light-brown or gray, they are injurious all the same, alike to health and to goods on which they are deposited.

Another defect in the law is that it is confined to soft coal as fuel. Numerous complaints have come to the department where the principal fuel was shavings and other waste. The law should include all kinds of fuel.

The ordinance at present in force reads as follows :

An Ordinance to amend Chapter Forty-three of the Revised Ordinances of 1892.

(CHAPTER 3.)

Be it enacted by the City Council of Boston, as follows :

SECTION 1. Chapter forty-three of the Revised Ordinances of 1892 is hereby amended by inserting between sections ninety-eight and ninety-nine, the following new section, to be numbered ninety-nine, and sections now numbered ninety-nine to one hundred and three, inclusive, with said amendment, to be numbered one hundred to one hundred and four respectively :

“SECT. 99. No person shall use bituminous coal for the purpose of generating steam in boilers in any building, unless the furnace in which said coal is burned is provided with some effectual device for consuming its own smoke.”

Approved May 7, 1892.

From the wording of the ordinance, it is evident that a device of any kind must at least be “effective” in preventing or consuming the smoke, and the officer designated to enforce the law is the sole judge of such effectiveness.

What is needed in this city is a new ordinance of more definite form, authorizing proper tests and providing the means for defraying expenses, and so regulating the use of *all fuels*, soft coal, hard coal, shavings, waste, etc., included, that better results may be obtained.

Such an ordinance should clothe the smoke-inspector with certain power and authority, that will allow him free and unrestricted access to all plants. It should declare in plain terms that the emission of smoke beyond a limited degree is a nuisance, and should regulate the settings of all boiler plants and furnaces, and should be extended in scope to include all domestic establishments, manufacturing and industrial concerns of all descriptions as far as the use of fuel is concerned, and provide at the same time for the publication of useful and proper information leading to the adoption of the best methods and the least offensive fuels.

As an example of a complete and well-framed ordinance of practical merit, the following St. Louis ordinance is quoted :

Ordinances 17049 and 17050 relating to Smoke Prevention.

(17049.)

An ordinance declaring the emission of dense black or thick gray smoke to be a nuisance, and to provide for the suppression thereof.

Be it ordained by the Municipal Assembly of the City of St. Louis, as follows :

SECTION 1. The emission into the open air of dense black or thick gray smoke within the corporate limits of the City of St. Louis is hereby declared to be a nuisance. The owners, occupants, managers, or agents of any establishment, locomotives, or premises from which dense black or thick gray smoke is emitted or discharged, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall pay a fine of not less than ten nor more than fifty dollars.

And each and every day wherein such smoke shall be emitted shall constitute a separate offence.

SECT. 2. This ordinance shall take effect at the expiration of six months after its approval by the Mayor.

Approved February 17, 1893.

(17050.)

An ordinance authorizing and providing for the making of regulations limiting and defining permissible smoke emissions, and for the testing of smoke prevention devices, and for the making of such tests and experiments as may be deemed advisable with a view to the abatement or suppression of the smoke nuisance.

Be it ordained by the Municipal Assembly of the City of St. Louis, as follows:

SECTION 1. The President of the Board of Public Improvements is hereby authorized and directed to appoint, with the approval of the Mayor, a commission composed of three competent persons. who shall not be directly or indirectly interested in the manufacture, sale, or construction of any furnace or other article having practical relation to the production or prevention of smoke. Said commission shall ascertain by a thorough canvas of the city, and report to the Board of Public Improvements within four months after their appointment, the conditions and liabilities under which manufacturing and other parties cannot wholly or reasonably prevent the occasional production and emission of dense visible smoke.

Such ascertained conditions and liabilities, when approved by the Board of Public Improvements and Mayor, shall be published, and thereafter shall constitute instructions to guide and limit the officials charged with the enforcement of smoke suppression ordinances. And it shall be a valid and sufficient defence against any complaint that the offence charged comes within such recognized conditions and liabilities.

Said commission shall conduct and make practical tests of all devices for the prevention or suppression of smoke which shall be submitted to them, in accordance with the conditions hereinafter set forth, and shall prepare detailed reports, stating the facts and conclusions based thereon, as to the efficiency of such device, the conditions of its successful operation, and the limitations to its efficiency. Said report shall be made promptly, when any test is completed, to the Board of Public Improvements, which report may be rejected by said Board if found to be unfair or untrue. If accepted by said Board, the report shall be published for the information of the public.

Said commission shall also be called upon by the President of the Board of Public Improvements to make such tests and experiments, as may, in his judgment, be needed to determine the applicability of special or smokeless fuels to domestic, locomotive, or other uses, with a view to the abatement or suppression of smoke, and shall prepare detailed reports of the results, together with such conclusions and recommendations as in their judgment may be warranted by the facts, said reports to be made promptly, and printed for the information of the public.

SECT. 2. The commissioners authorized by the preceding section shall receive, in compensation for their services in ascertaining, by a thorough canvas of the city, and reporting the conditions and liabilities of smoke suppression, the sum of one thousand dollars each, payable upon the certificate of the President of the Board of Public Improvements that such report has been made to and accepted by the Board of Public Improvements. For their services in conducting tests of devices, and making reports thereon, they shall each receive the sum of seventy-five dollars for each device tested and reported, and for conducting the special tests and experiments, as provided in the preceding section, one hundred dollars for each series of tests or experiments, together with a

full report of the same. Said respective sums to be paid on the certificate of the President of the Board of Public Improvements that the report of such test has been received and accepted by said Board.

Incidental and necessary expenses for the above-described investigations shall be allowed and paid for as other expenses of the office of the President of the Board of Public Improvements.

SECT. 3. Any party having, or claiming to have, a plan or device whereby smoke can be prevented or suppressed, and desiring to have the same subjected to a practical test and determination, may do so on the following conditions:

First. He or they shall notify, in writing, the President of the Board of Public Improvements that such a test is desired, and with such notice shall file a full and complete description of the device, with all necessary drawings to show its character, construction, and mode of operation. Accompanying such notice shall be a certificate of the City Treasurer that there has been deposited with him to the account of the fund for testing smoke-prevention device, the sum of four hundred dollars, and said sum of four hundred dollars shall thereupon absolutely become the property of the City of St. Louis, and no claim shall hereafter be made or allowed to refund the same or any part thereof; and upon the presentation of the Treasurer's certificate to that effect, the President of the Board of Public Improvements shall order the commission to make the test.

Second. The party or parties submitting a device shall erect the same at such place as the commission may approve, at their own cost and expense, under their own supervision, with such provisions for the attachment of instruments as the commission may require, and when fully ready shall deliver the premises and equipment to the commission.

Third. If, after test is begun, alterations or improvements are desired to be made, the party interested must proceed as if submitting a new plan or device, unless the several commissioners shall each consent to such alterations, and waive all claim for compensation for a special test.

SECT. 4. Whenever the Mayor shall be of the opinion that the public interest does not warrant the further testing and reporting on devices, under the authority of the City of St. Louis, he shall notify the President of the Board of Public Improvements to that effect, in which event the existence of the commission hereby authorized shall terminate when tests already in hand shall have been completed and reported as herein provided.

SECT. 5. When the commission created by the preceding sections of this ordinance shall have made its report as provided in section one, and shall have found that there are practicable methods of appliances by which the emission of dense, black, or thick gray smoke may be prevented, and such report shall have been approved as hereinbefore provided; and also, when an ordinance declaring the emission of dense black or thick gray smoke to be a nuisance, and to provide for the suppression thereof shall have come into full force and effect, then the President of the Board of Public Improvements is hereby authorized and directed to appoint, with the approval of the Mayor, such inspectors as may be necessary to carry out the provisions of the following section or this ordinance. Said inspectors shall receive a salary of one hundred dollars a month each, payable monthly.

SECT. 6. The inspectors shall have a right to enter in the performance of their duties, at reasonable hours, upon all premises other than dwelling-houses occupied by less than four families or tenants. They shall collect evidence of the facts in the cases of the violation of this ordinance, declaring the emission of black or thick gray smoke to be a nuisance, and to provide for the suppression thereof, and, with the approval of the President of the Board of Public Improvements, shall report the same to the City Attorney for prosecution. The inspectors shall

be guided in the performance of their duties by instructions given by the Board of Public Improvements from time to time.

Approved February 17, 1893.

With a full and complete ordinance in operation, similar in character to the one quoted above, but adapted to our organization as provided by the City Charter, backed up by an annual appropriation by the board of government, the city of Boston might easily keep the emission of smoke under full control, and reduce the nuisance to such a limit that this could well be called the cleanest city in the country.

CONCLUSION.

On January 12, 1894, the death occurred of Mr. George W. Forristall, Deputy Superintendent of the Sanitary Division, and formerly, for many years, the Superintendent of the Health Department.

Mr. Forristall entered the service of the city in 1855, as foreman of the North End yard, under his father, Mr. Ezra Forristall, the Superintendent of Health at that time.

In 1869 Mr. Forristall was appointed Superintendent of the Health Department, and remained in that position until the department was abolished and consolidated with the Street Department, in 1891, when he was appointed Deputy Superintendent of the Sanitary Division.

Mr. Forristall was a very conscientious and painstaking official, and was devoted to his work, making it a point to personally inspect and oversee all details pertaining to his division. The loss of his services to the city of Boston will be severely felt.

Five Appendices are herewith submitted, in which will be found the reports of the several deputy superintendents, showing the expenditures of each division in detail. They are as follows :

Appendix A — Bridge Division.

“ B — Paving Division.

“ C — Sanitary Division.

“ D — Sewer Division.

“ E — Street-Cleaning Division.

“ F — Former Superintendents and Document Numbers.

I desire to extend to His Honor Mayor Nathan Matthews, Jr., my thanks for his coöperation and support in matters connected with the department, and to the Honorable City Council for their liberal spirit shown in making appropriations.

Respectfully submitted,

H. H. CARTER,

Superintendent of Streets.

STREET DEPARTMENT.

ORGANIZATION, 1893.

Central Office Room 47, City Hall.

HENRY H. CARTER,

Superintendent of Streets.

JOHN W. McDONALD, *Purchasing Agent.*

HENRY B. WOOD, *Secretary and Executive Engineer.*

PAVING DIVISION.

Room 41, City Hall.

CHARLES R. CUTTER, *Deputy Superintendent.*

BENJAMIN B. TREMERE, *Chief Clerk.*

SEWER DIVISION.

Room 44, City Hall.

HENRY W. SANBORN, *Deputy Superintendent (ex officio, Engineer Improved Sewerage).*

FRANK H. RICE, *Chief Clerk.*

Engineer's Office, 12 Beacon Street.

E. S. DORR, *Engineer in Charge.*

SANITARY DIVISION.

12 Beacon Street.

PHILIP A. JACKSON, *Acting Deputy Superintendent.*

M. J. MURRAY, *Chief Clerk.*

STREET-CLEANING DIVISION.

14 Beacon Street.

PHILIP A. JACKSON, *Deputy Superintendent.*

THOMAS McLAUGHLIN, *Chief Clerk.*

BRIDGE DIVISION.

14 Beacon Street.

JOHN A. McLAUGHLIN, *Deputy Superintendent.*

FREDERICK H. SPRING, *Chief Clerk.*

BOSTON AND CAMBRIDGE BRIDGES.

HENRY H. CARTER, *Commissioner for Boston (ex officio).*

WILLIAM J. MARVIN, *Commissioner for Cambridge.*

APPENDIX A.

REPORT OF THE DEPUTY SUPERINTENDENT OF THE
BRIDGE DIVISION.14 BEACON STREET,
BOSTON, February 1, 1894.H. H. CARTER, ESQ., *Superintendent of Streets* :

DEAR SIR: The following report of the expenditures, acts, and doings of the Bridge Division from February 1, 1893, to January 31, 1894, is respectfully submitted.

On February 1, 1893, the sum of \$135,000 was assigned to this division for the care, maintenance, etc., of the bridges, and there was expended the sum of \$133,159.24, leaving a balance of \$1,840.76. The total number of bridges in Boston, not including culverts, is one hundred and ten; four of these, viz., Harvard, Canal, Prison Point, and West Boston bridge, all connecting Cambridge, are in the care of two Commissioners, one of whom is appointed by the City of Boston, and the other by the City of Cambridge. The remainder are under the supervision of this division, and are thus tabulated: thirty-five are wholly supported by railroad corporations, and seventy-five are supported wholly or in part by the City of Boston; included in this number are twenty-three tide-water bridges, provided with draws. The increase of two bridges consists of one at Everett street, Allston, over tracks of Boston & Albany Railroad, the other at Castle Island.

Embodied in the report will be found a detailed statement of the expenditures and a description of the work performed on each bridge; also a tabulated arrangement of those bridges supported wholly or in part by the City of Boston; widths of draw openings; widths of bridges, roadways, and sidewalks; kind of pavement used; number of draw openings made for navigation; census of traffic taken on some of the most important bridges, September 5, 1893, as a comparison with that taken in June, 1892, and April, 1891; also an inventory of tools, vehicles, etc., on hand.

The general condition of the bridges is good, except in the following case: Chelsea-street bridge, from East Boston to Chelsea, is in a decayed state and has outlived its usefulness. The following is an extract from report of the City Engineer, 1891: "This is a wooden pile bridge; was originally built in 1834, was rebuilt in 1848, and again rebuilt in 1873, and the present draw was built in 1868. The part of the bridge between the draw and Chelsea was burned in 1887, and rebuilt in a temporary manner, and the draw is so low that it will be necessary to raise the grade of

the whole bridge when a new draw is built. Estimates for rebuilding this bridge were made in 1889. It is narrow and inconvenient and the draw and its foundations are in a dangerous condition. The travel over the bridge is increasing, and the passage of vessels through the draw is increasing. It is a dangerous bridge, and its rebuilding should not be delayed." The present condition of the bridge is such that at times it requires the services of a tow-boat to turn off the draw, and some measures should be adopted to rebuild at the earliest opportunity.

Provision has recently been made by the City Government of 1894 for a new structure to take the place of the present Charles-river bridge, which is worn out.

Extensive repairs have been made on Broadway bridge, to strengthen the structure, and it is expected that soon the electric cars will operate on the bridge, thus relieving South Boston in a degree from the loss of Dover-street bridge during rebuilding, and also relieving Federal street from the present arrangement of car service, all cars now from Boston to South Boston being compelled to run over Federal-street bridge.

The report also contains a statement of the maintenance expenses of the two districts comprising the Bridge Division. A larger amount of work has been performed than at any other equal period of time, and the results have been highly satisfactory both from the manner in which the work was performed, and the prompt way in which material whenever ordered was delivered.

The operatives of the tide-water bridges have performed their duties in an efficient manner, and have kept their houses, piers, etc., in a clean and safe condition.

The same care has been exercised as formerly to keep on hand duplicate sets of gearing, and no delay has been occasioned through lack of material for repairs.

The inland bridges require much care, and special effort has been made to keep them safe and clean. They have been swept each week, and the scupper-holes kept free and clear.

SPECIAL WORK.

The total amount of money so expended and charged was \$18,478.25. Of this sum \$15,285.33 was paid to various persons for material and work which could not be performed by our own men. The balance, \$3,192.92, was directly beneficial to our own mechanics.

The report contains a description of the work performed on the several bridges for which money was provided from special appropriations.

PUBLIC LANDING-PLACES.

The following public landing-places have been built by the city, and are maintained and controlled by the Street Department.

Charles-river Bridge. — Size, 40 × 60. Built in 1890. Moored from city's property.

Essex-street Bridge. — Size, 9×23 . Built in 1890. Moored from city's property.

East Boston, Public Landing. — Size, 18×30 . Built in 1893. Moored at dock of East Boston Dry Dock Company, dock and flats leased at \$200 per year.

Commercial Wharf. — Size, 30×50 . Built by M. F. Sullivan; contract dated January 1, 1892. Moored at dock of Commercial Wharf Corporation. Dock and flats leased November 30, 1891, at \$1,000 per year.

Federal-street Bridge. — Size, 20×35 . Built by M. F. Sullivan, October 26, 1892. Moored from city's property.

CABLE-HOUSES.

The following is a list of cable-houses, on bridges in charge of this division:

New England Telephone and Telegraph Company.

Charles-river bridge	2 houses.
Chelsea, south bridge	1 house.
Congress-street bridge	2 houses.

(Erected in 1882.)

American Telephone and Telegraph Company.

Federal-street bridge (erected in 1890),	1 house.
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West End Street Railway Company.

Federal-street bridge	2 houses.
Warren bridge	2 houses.

(Erected in June, 1892.)

The cable-houses that were on the Dover-street bridge were cut off by the rebuilding of the bridge.

Very respectfully yours,

JOHN A. McLAUGHLIN,

Deputy Superintendent.

FINANCIAL STATEMENT.

REGULAR APPROPRIATION.

Appropriation, 1893-4 \$135,000 00

Amount of expenditures charged to Bridge Division,

February 1, 1893, to January 31, 1894 . .	133,159 24
Transferred to City Treasury, January 31, 1894 .	1,840 76

Total	<u>\$135,000 00</u>
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EXPENDITURES.

Administration.

Office expenses :	
Printing	\$147 10
Stationery and postage	77 41
Office books	31 25
Telephone	139 30
Engraving plates, etc., annual report	59 11
Repairs on books, etc.	65 05
Sundries	23 70
	<hr/>
	\$542 92
Salaries of Deputy Superintendent, Clerks, and Messenger	6,145 12
Salaries of General Foreman and two District Foremen	5,147 50
Travelling expenses of Deputy Superintendent and General Foreman	40 00
Board of Deputy Superintendent's horse and extra horse	484 00
	<hr/>
Amount expended, administration	<u>\$12,359 54</u>

TOTAL REGULAR EXPENDITURES.

Expenditures, administration	\$12,359 54
“ on tide-water bridges	90,344 78
“ on inland bridges	14,660 48
“ North yard and stable	4,671 63
“ South “ “ “	11,122 81
	<hr/>

Total amount expended for the year, February 1, 1893, to January 31, 1894 \$133,159 24

TIDE-WATER BRIDGES.

Broadway bridge (over Fort Point channel).

Sheathed roadway and repaired deck where defective, put in new oak headers on draw, repaired pier, waterway, wheel guards and latches, repaired boat, repaired engines and painted bridge overhead and underneath one coat.

Carpenters	\$1,564 25
Painters	666 50
Lumber	1,134 70
Nails and spikes	108 61
Ironwork	1,514 38
Hardware	12 39
	<hr/>

Carried forward, \$5,000 83

<i>Brought forward,</i>	\$5,000 83	
Paint stock	147 27	
Plumbing	175 80	
Carpenter-work and stock .	25 89	
New gas service pipe . .	60 18	
Repairing boats	14 50	
Veterinary service (accident)	69 00	
Repairing concrete walk .	5 00	
Teaming	36 00	
	<hr/>	\$5,534 47

Regular expenses :		
Draw-tenders	\$5,779 49	
Substitutes	93 80	
Coal	255 60	
Gas	36 02	
Water	25 00	
Sand	4 25	
Lubricating oil	16 25	
Hose	15 00	
Ice	6 00	
Cautionary signs	45 00	
Small supplies	129 45	
	<hr/>	6,405 86
	<hr/>	\$11,940 33

Cambridge-street bridge (from Brighton to Cambridge).

Reset buoy and made small repairs on draw.

Resetting buoy	\$75 00	
Ironwork	7 00	
Hardware	1 40	
Car-fares	72	
	<hr/>	\$84 12

Regular expenses :		
Draw-tender	\$365 56	
Coal	5 45	
Small supplies	4 35	
	<hr/>	375 36
	<hr/>	459 48

Charles-river bridge (from Boston to Charlestown).

Repaired piles and pier, repaired deck and sheathed draw three times, new sidewalk stringers and walk on draw, put in trucks five times, strengthened fence entire length of roadway, repaired engine and waterway, reset buoy, repaired brick sidewalk, and painted fence two coats.

Carpenters	\$1,272 07	
Painters	246 50	
Lumber	621 86	
Nails and spikes	24 75	
	<hr/>	
<i>Carried forward,</i>	\$2,165 18	\$12,399 81

<i>Brought forward,</i>	\$2,165 18	\$12,399 81
Ironwork	753 33	
Repairing engine	166 49	
Hardware	3 83	
Paint stock	88 94	
Resetting buoy	25 00	
Bricks, sand, etc. . . .	11 60	
	<hr/>	
	\$3,214 37	

Regular expenses :

Draw-tenders	\$5,047 56	
Coal	514 20	
Gas	54 70	
Water	30 75	
Cordage	285 99	
Bedding	5 40	
Salt	9 45	
Kerosene oil	8 64	
Lubricating oil	20 56	
Hose	16 25	
Ice	6 00	
Small supplies	80 31	
	<hr/>	
	6,079 81	
	<hr/>	
		9,294 18

Chelsea bridge [North] (over North channel, Mystic river).

Repaired draw-tenders' house and fence, sheathed draw and approaches twice, repaired deck where defective, put in new rests on draw abutment, repaired wheel-guard, put in trucks three times, repaired piles and waterway, repaired and painted machinery.

Carpenters	\$410 88	
Painters	21 00	
Lumber	286 72	
Nails and spikes	5 85	
Ironwork	226 66	
Repairing engine	133 60	
Hardware	5 98	
Paint stock	5 25	
	<hr/>	
	\$1,095 94	

Regular expenses :

Draw-tenders	\$3,589 04		
Substitutes	120 00		
Coal	294 75		
Gas	39 37		
Bedding	6 20		
Salt	5 75		
Lubricating oil	17 25		
Shovels	9 75		
	<hr/>		
<i>Carried forward,</i>	\$4,082 11	\$1,095 94	\$21,693 99

<i>Brought forward,</i>	\$4,082 11	\$1,095 94	\$21,693 99
Ice	6 00		
Small supplies	65 00		
	<hr/>	4,153 11	
			5,249 05

Chelsea bridge [South] (over South channel,
Mystic river).

Sheathed draw twice, put in new oak headers, built new ladder from pier to float-stage, repaired deck, waterway, and fence, repaired and painted machinery.

Carpenters	\$262 03		
Painters	5 00		
Lumber	122 47		
Nails and spikes	20 25		
Ironwork	112 00		
Repairing engine	64 17		
Hardware	3 05		
Paint stock	4 75		
	<hr/>	\$593 72	

Regular expenses:

Draw-tenders	\$4,386 72		
Substitutes	87 50		
Coal	250 65		
Gas	27 30		
Water	12 50		
Bedding	5 40		
Salt	5 20		
Ice	6 00		
Lubricating oil	4 75		
Shovels	7 51		
Tug, breaking ice	24 00		
Small supplies	34 93		
	<hr/>	4,852 46	

5,446 18

Chelsea-street bridge (from East Boston to
Chelsea).

Repaired gearing and sheathed draw. [Lumber
from stock.]

Carpenters	\$59 00		
Lumber	2 28		
Nails and spikes	8 00		
Ironwork	27 75		
Car-fares	12 80		
	<hr/>	\$109 83	

Regular expenses:

Draw-tender	\$299 00		
Small supplies	3 53		
	<hr/>	302 53	

412 36

Carried forward,

\$32,801 58

<i>Brought forward,</i>		\$32,801 58
Commercial Point or Tenean bridge (Dorchester).		
Repaired and sheathed draw, deck where defective, fence and flaps.		
Carpenters	\$96 19	
Lumber	174 05	
Nails	4 50	
Ironwork	4 70	
	<hr/>	\$279 44
Regular expenses :		
Draw-tender	50 00	
	<hr/>	329 44

Congress-street bridge (over Fort Point channel).

Sheathed draw twice, repaired deck where defective, put in new headers three times, repaired gates, steps, fences, latches, pier, and boat, repaired waterway four times, also repaired engines and water connections.

Carpenters	\$493 50	
Painters	22 50	
Lumber	402 84	
Nails and spikes	20 50	
Ironwork	533 70	
Repairing engines	299 61	
Hardware	6 44	
Plumbing	186 32	
Repairing buoy	25 60	
	<hr/>	\$1,991 01

Regular expenses :

Draw-tenders	\$5,317 09	
Substitutes	564 24	
Coal	374 00	
Water	106 13	
Bedding	13 80	
Sand	7 25	
Salt	4 50	
Ice	6 00	
Kerosene oil	20 16	
Lubricating oil	20 05	
Lanterns	10 83	
Shovels	6 92	
Hose	26 41	
Small supplies	102 75	
	<hr/>	6,580 13
		8,571 14

Dover-street bridge (over Fort Point channel).

Sheathed one roadway, built fence, repaired gates, boat, waterway, water-pipes, and stable.

Carpenters	\$178 75
Lumber	41 23

Carried forward,

\$219 98

\$41,702 16

<i>Brought forward,</i>	\$219 98	\$41,702 16
Nails and spikes	4 50	
Ironwork	70 40	
Hardware	3 08	
Plumbing	43 25	

\$341 21

Regular expenses :

Draw-tenders	\$3,375 24
Substitutes	651 86
Coal	32 70
Feed	151 83
Gas	19 42
Water	15 00
Bedding	18 20
Tan	22 00
Lubricating oil	38 75
Ice	6 00
Horse-shoeing	29 50
Veterinary service . . .	29 00
Small supplies	51 89

4,441 39

4,782 60

Essex-street bridge (from Brighton to Cambridge).

Sheathed roadway and repaired wheel-guard and row-boat.

Carpenters	\$75 00
Lumber	101 56
Nails and spikes	13 00
Ironwork	7 45
Hardware	11 45
Car-fares	20 00
Repairing boat	17 80

\$246 26

Regular expenses :

Draw-tender	\$658 32
Substitute	20 00
Coal	10 90
Small supplies	8 56

697 78

944 04

Federal-street bridge (over Fort Point channel).

Sheathed both roadways, repaired pier and water-way three times, put in trucks once, new oak headers on draw twice, repaired motor-house and draw-tenders' house, repaired boat, machinery, and water-pipes, and painted bridge underneath one coat.

Carpenters	\$178 43
Painters	396 50

Carried forward, \$574 93

\$47,428 80

<i>Brought forward,</i>	\$574 93	\$47,428 80
Lumber	299 83	
Nails and spikes	13 45	
Ironwork	346 47	
Hardware	26 43	
Paint stock	91 29	
Plumbing	124 50	
Repairing roofs of draw-tenders' and motor houses .	52 10	
Repairing buildings, carpenters' bills for labor and stock,	184 01	
Repairing boat	18 85	
	<hr/>	\$1,731 86

Regular expenses :

Draw-tenders	\$6,247 69	
Substitutes	195 00	
Coal	53 25	
Gas	54 13	
Water	15 00	
Lubricating oil	23 90	
Hose	25 89	
Motor-house pans	40 00	
Ice	6 00	
Portable furnace	110 40	
Small supplies	39 03	
	<hr/>	6,810 29
		<hr/>
		8,542 15

Granite bridge (from Dorchester to Milton).

Put in new deck and sheathed the same, also new flaps on draw.

Carpenters	\$192 25	
Lumber	85 44	
Nails and spikes	4 75	
Ironwork	22 03	
Hardware	90	
	<hr/>	\$305 37

Regular expenses :

Draw-tender	\$239 20	
Small supplies	4 35	
	<hr/>	243 55
		<hr/>
		548 92

L-street bridge (over reserved channel at junction of Congress and L streets).

Repaired damage done to pier, and repaired buildings.

Carpenters	\$111 25	
Watchman during building of bridge by the City Engineer	740 25	
Lumber	17 30	
	<hr/>	
<i>Carried forward,</i>	\$868 80	\$56,519 87

<i>Brought forward,</i>	\$868 80	\$56,519 87
Hardware	16 35	
Paint stock	9 39	
Plumbing	11 62	
Carpenters' bill	105 00	
	<hr/>	\$1,011 16

Regular expenses :

Draw-tender	\$322 14	
Substitutes	519 03	
Watchman	635 00	
Coal	58 70	
Water	2 50	
Small supplies	33 90	
	<hr/>	1,571 27
		<hr/>
		2,582 43

Malden bridge (from Charlestown to Everett).

Sheathed draw, put in new oak headers, repaired wheel-guard, waterway, and latches, painted house and bridge one coat.

Carpenters	\$419 13	
Painters	147 50	
Lumber	361 50	
Nails and spikes	70 65	
Ironwork	48 72	
Hardware	2 00	
Paint stock	48 27	
Car-fares	37 25	
Plumbing	4 34	
	<hr/>	\$1,139 36

Regular expenses :

Draw-tenders	\$2,791 36	
Substitutes	280 00	
Coal	37 40	
Gas	17 40	
Bedding	3 10	
Salt	3 70	
Lubricating oil	5 00	
Ice	6 00	
Small supplies	46 66	
	<hr/>	3,190 62
		<hr/>
		4,329 98

Meridian-street bridge (from East Boston to Chelsea).

Sheathed draw twice, repaired sidewalk, latches, stable, road-gates, and waterway, put in new rack, repaired machinery and gear.

Carpenters	\$572 14	
Painters	3 00	
Lumber	278 79	
Nails and spikes	27 00	

<i>Carried forward,</i>	<hr/>	<hr/>
	\$880 93	\$63,432 28

<i>Brought forward,</i>	\$880 93	\$63,432 28
Ironwork	591 92	
Hardware	2 32	
Plumbing	36 98	
Car-fares	31 97	
Damage to tug	275 17	
	<hr/>	\$1,819 29

Regular expenses :

Draw-tenders	\$2,037 99	
Substitutes	1,192 50	
Coal	27 25	
Feed	118 80	
Gas	19 00	
Horse-shoeing	31 50	
Veterinary service	69 00	
Repairing stove	19 05	
Lubricating oil	10 00	
Hose	7 56	
Ice	6 00	
Small supplies	56 22	
	<hr/>	3,594 87
		<hr/>
		5,414 16

Mt. Washington-avenue bridge (over Fort Point channel.)

Sheathed draw twice, repaired wheel-guard, piers, latches, and draw-tender's house, put in new oak headers on draw twice, set one new and one old buoy, repaired row-boat and also water-pipes.

Carpenters	\$467 88	
Painters	7 50	
Lumber	139 09	
Nails and spikes	5 00	
Ironwork	68 29	
Hardware	14 63	
Plumbing	106 83	
Repairing and setting buoy	114 08	
Repairing boat	12 50	
	<hr/>	\$935 80

Regular expenses :

Draw-tenders	\$4,780 20	
Substitutes	173 29	
Coal	36 90	
Gas	64 75	
Water	5 00	
Rent of land	60 00	
Bedding	16 80	
Hose	15 06	
Lubricating oil	13 00	
Ice	6 00	
Shovels	6 01	
	<hr/>	
<i>Carried forward,</i>	\$5,177 01	\$935 80
		<hr/>
		\$68,846 44

<i>Brought forward,</i>	\$5,177 01	\$935 80	\$68,846 44
Salt	4 50		
Sand	7 00		
Small supplies	54 71		
	<hr/>	5,243 22	
			6,179 02

Neponset bridge (from Dorchester to Quincy).

Sheathed roadway and repaired deck where defective, repaired flaps, piers, waterway, and row-boat, also reset buoy.

Carpenters	\$153 94		
Lumber	125 87		
Nails and spikes	7 70		
Ironwork	9 85		
Car-fares	10 00		
Resetting buoy	77 35		
Repairing boat	26 40		
	<hr/>	\$411 11	

Regular expenses :

Draw-tender	\$382 40		
New row-boat	45 00		
Small supplies	9 75		
	<hr/>	437 15	
			848 26

North Beacon-street bridge (from Brighton to Watertown).

Repaired sheathing and deck where defective, put in new latches, sheathed draw, and painted bridge one coat.

Carpenters	\$70 75		
Painters	78 50		
Lumber	118 75		
Nails and spikes	6 75		
Ironwork	44 88		
Paint stock	21 51		
Car-fares	5 92		
	<hr/>	\$347 06	

Regular expenses :

Draw-tender	74 88		
	<hr/>		421 94

North Harvard-street bridge (from Brighton to Cambridge).

Sheathed draw and roadway and repaired deck where defective, painted draw-tender's house and bridge one coat.

Carpenters	\$25 00		
Painters	135 75		
Lumber	41 13		
Nails and spikes	29 30		
Ironwork	2 00		

Carried forward,

\$233 18

\$76,295 66

<i>Brought forward,</i>	\$233 18	\$76,295 66
Paint stock	35 14	
Car-fares	80	
	<hr/>	
	\$269 12	

Regular expenses :	
Draw-tender	365 56
	<hr/>

634 68

Warren bridge (from Boston to Charlestown).
 Sheathed easterly draw five times, westerly draw four times, put in new deck on westerly draw, new oak headers on both draws twice, put in trucks six times, reset tracks and repaired track timbers in pit, repaired fence, road-gates, engine-house, waterway, engines, water connections, boilers, and painted road-gates.

Carpenters	\$728 50	
Painters	77 75	
Lumber	915 25	
Nails and spikes	39 70	
Ironwork	489 23	
Repairing engines	228 93	
Hardware	4 16	
Paint stock	15 00	
Plumbing	66 45	
	<hr/>	
	\$2,564 97	

Regular expenses :				
Draw-tenders	.	.	.	\$4,944 31
Substitutes	.	.	.	217 50
Coal	.	.	.	855 50
Gas	.	.	.	116 40
Water	.	.	.	50 00
Bedding	.	.	.	18 00
Sand	.	.	.	3 75
Salt	.	.	.	8 75
Lubricating oil	.	.	.	19 75
Hose	.	.	.	33 44
Ladder	.	.	.	22 61
Shovels	.	.	.	10 52
Ice	.	.	.	6 00
Clock	.	.	.	7 00
Small supplies	.	.	.	53 11
				<hr/>
				6,366 64

8,931 61

Western-avenue bridge (from Brighton to Cambridge).

Sheathed draw and roadway, put in new flaps, repaired fence, piles, and waterway, and painted bridge one coat.

Carpenters	\$285 50
Painters	134 50
	<hr/>

Carried forward, \$420 00

\$85,861 95

<i>Brought forward,</i>	\$420 00	\$85,861 95
Lumber	114 68	
Ironwork	20 56	
Paint stock	33 82	
Car-fares	13 94	
	<hr/>	\$603 00

Regular expenses :

Draw-tender	\$365 56	
Coal	5 45	
Stove-pipe	5 07	
	<hr/>	376 08

979 08

Western-avenue bridge (from Brighton to Watertown).

New draw-chains and repairing old one.

New chains	\$4 40	
Ironwork	4 75	
	<hr/>	\$9 15

Regular expenses :

Draw-tender	74 88	
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84 03

Winthrop bridge (from Breed's Island to Winthrop).

Painted bridge one coat.

Painters	\$182 25	
Paint stock	37 60	
Car-fares	5 80	
	<hr/>	\$225 65

Regular expenses :

Draw-tender	\$100 00	
Small supplies	1 25	
	<hr/>	101 25

326 90

Sundry expenditures on tide-water bridges.

Tug-hire	\$35 00	
Car-fares, mechanics	179 42	
Lumber, sundry repairs	119 53	
Nails, sundry repairs	18 00	
	<hr/>	\$351 95

Regular expenses :

Chief draw-tender (37 weeks), \$1,295 00		
Messenger	782 34	
Lubricating oil, supplies	616 50	
Galvanized barrels	24 00	
Stationery	8 95	
Printing	4 08	
Car-fares	10 00	
	<hr/>	2,740 87

3,092 82

Total expended on tide-water bridges \$90,344 78

RECAPITULATION.

Table showing Expenditures on the Tide-water Bridges for the Year, February 1, 1893, to January 31, 1894.

NAME OF BRIDGE.	Repairs, labor, lumber, iron- work, and painting.	Regular ex- penses, sal- aries, fuel, and supplies.	Total.
Broadway	\$5,534 47	\$6,405 86	\$11,940 33
Cambridge street	84 12	375 36	459 48
Charles river	3,214 37	6,079 81	9,294 18
Chelsea (North)	1,095 94	4,153 11	5,249 05
Chelsea (South)	593 72	4,852 46	5,446 18
Chelsea street	109 83	302 53	412 36
Commercial Point	279 44	50 00	329 44
Congress street	1,991 01	6,580 13	8,571 14
Dover street	341 21	4,441 39	4,782 60
Essex street	246 26	697 78	944 04
Federal street	1,731 86	6,810 29	8,542 15
Granite	305 37	243 55	548 92
L street	1,011 16	1,571 27	2,582 43
Malden	1,139 36	3,190 62	4,329 98
Meridian street	1,819 29	3,594 87	5,414 16
Mt. Washington avenue	935 80	5,243 22	6,179 02
Neponset	411 11	437 15	848 26
North Beacon street	347 06	74 88	421 94
North Harvard street	269 12	365 56	634 68
Warren	2,564 97	6,366 64	8,931 61
Western avenue (to Cambridge)	603 00	376 08	979 08
Western avenue (to Watertown)	9 15	74 88	84 03
Winthrop	225 65	101 25	326 90
Chief draw-tender, and sundry expendi- tures	351 95	2,740 87	3,092 82
Totals	\$25,215 22	\$65,129 56	\$90,344 78

INLAND BRIDGES.

Albany-street bridge (over Boston & Albany Railroad).

Sheathed roadway.

Carpenters	\$71 00
Watchman	10 00
Lumber	99 86
Nails	4 50

\$185 36

Ashland-street bridge (over New York, New Haven, & Hartford Railroad, Providence Div'n).

New deck laid, sheathed the same, and painted bridge one coat.

Painters	\$180 00
Paint stock	38 92
Car-fares	10 00

228 92

Atlantic avenue (at Commercial Wharf).

Built new bulkhead, rebuilt about twenty feet of sidewalk, new fender-guards, and repaired fence.

Carpenters	\$181 25
Lumber	125 81
Ironwork	35 11

342 17

Beacon-street bridge (over Boston & Albany Railroad).

Sheathed roadways, repaired sidewalks and fences.

Carpenters	\$33 50
Lumber	133 15
Nails	4 50

171 15

Beacon-street bridge (over outlet to Back Bay Fens).

Sheathed roadway.

Carpenters	\$16 44
Lumber	74 51
Nails	4 20

95 15

Berkeley-street bridge (over Boston & Albany Railroad).

Repointing underpinning

373 50

Berkeley-street bridge (over New York, New Haven, & Hartford Railroad, Providence Div'n).

Sheathed roadways twice, repaired deck where defective, built new sidewalks, pointed abutments, and painted bridge underneath one coat.

Carpenters	\$860 49
Painters	241 75
Watchman	17 50

Carried forward,

\$1,119 74

\$1,396 25

<i>Brought forward,</i>	\$1,119 74	\$1,396 25
Lumber	914 85	
Nails	53 45	
Ironwork	32 56	
Hardware	4 85	
Paint stock	125 19	
Pointing abutments	307 00	
Teaming	78 00	
Cement and sand	6 00	
	<hr/>	2,641 64

Blakemore-street bridge (over New York, New Haven, & Hartford Railroad, Providence Div'n).

Painted bridge underneath and top one coat.	
Painters	\$188 25
Paint stock	46 41
Cleaning rust	60 00
Car-fares	10 00
	<hr/>

304 66

✓ **Boylston-street bridge** (over Boston & Albany Railroad).

Repaired sheathing, and painted bridge underneath and top two coats.	
Carpenters	\$25 00
Painters	217 25
Lumber	19 78
Paint stock	31 01
	<hr/>

293 04

Broadway bridge (over Boston & Albany Railroad).

Sheathed roadway.	
Carpenters	\$54 00
Lumber	149 16
Nails	9 00
	<hr/>

212 16

Byron-street bridge (over Boston, Revere Beach, & Lynn Railroad).

Sheathed roadway, and painted bridge underneath and top one coat.	
Carpenters	\$27 50
Painters	37 50
Lumber	85 65
Nails	4 50
Paint stock	50 22
Car-fares	7 20
	<hr/>

212 57

Canterbury-street bridge (over Stony brook).

Laid new deck and sheathed the same.	
Carpenters	\$70 83
Lumber	93 38
Nails	9 50
	<hr/>

173 71

Carried forward,

\$5,234 03

Brought forward,

\$5,234 03

Cass-street culvert, West Roxbury.

Put in new deck.

Carpenters	\$11 00
Lumber	23 22

34 22

Central-avenue bridge (from Dorchester to Milton).

Repaired sheathing.

Carpenters	\$10 75
Lumber	37 48
Car-fares	10 00

58 23

Columbus-avenue bridge (over Boston & Albany Railroad).

Sheathed roadway and repaired sidewalk.

Carpenters	\$57 25
Lumber	94 50
Nails	4 50

156 25

Congress street (South Boston).

Built new plank-walk and fence.

[For balance expended see "Street Improvements,
Aldermanic District No. 6."]
(Work uncompleted.)

Carpenters	\$371 00
Lumber	2 28
Tools	24 05
Nails	7 50

404 83

Cottage-street [foot] bridge (from Jeffries Point to Wood Island).

Watchman (permanently employed) . .	\$728 00
Coal	5 45
Car-fares	84
Displacement of tide-water	18 80

753 09

Dartmouth-street bridge (over Boston & Albany Railroad and Providence Division of New York, New Haven, & Hartford Railroad).

Sheathed roadway.

Carpenters	\$61 70
Lumber	173 30
Nails	9 00

244 00

Dorchester-street bridge (over New York, New Haven, & Hartford Railroad, Plymouth & Taunton Division).

Sheathed roadway and made repairs.

Carpenters	\$5 00
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Carried forward,

\$5 00

\$6,884 65

<i>Brought forward,</i>	\$5 00	\$6,884 65
Paid bill of N.Y., N.H., & H. Railroad for carpenter-work and labor, being one-fifth, or city's part	94 48	
	<hr/>	99 48

Elmwood-street bridge (over Stony brook).

Sheathed roadway and put in new deck.

Carpenters	\$63 75	
Lumber	55 46	
Nails	7 25	
	<hr/>	126 46

Ferdinand-street bridge (over Boston & Albany Railroad).

Repaired and pointed abutments and wings.

Masons' bill		288 75
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Gold-street [foot] bridge (over New York & New England Railroad).

Repaired roadway.

Carpenters	\$10 00	
Lumber	1 30	
	<hr/>	11 30

Huntington-avenue bridge (over Boston & Albany Railroad).

Sheathed roadways, rebuilt sidewalks, repointed abutments, and painted bridge underneath and top.

Carpenters	\$306 83	
Painters	239 00	
Watchman	27 50	
Lumber	373 35	
Nails	12 25	
Paint stock	46 67	
Pointing abutments	88 25	
Cleaning rust	18 00	
Teaming	42 00	
	<hr/>	1,153 85

Hyde Park-avenue bridge (over Stony brook).

Sheathed roadway, repaired deck where defective, and repaired fence.

Carpenters	\$41 33	
Lumber	50 73	
Nails	4 50	
	<hr/>	96 56

Irvington-street [foot] bridge (over New York, New Haven, & Hartford Railroad).

Painted bridge underneath and top.

Painters	\$112 50	
Paint stock	16 68	
	<hr/>	129 18

Carried forward,

\$8,790 23

Brought forward,

\$8,790 23

Jamaica-street culvert (West Roxbury).

Repaired deck and sheathing.

Carpenters	\$14 38
Lumber	16 25

30 63

Leyden-street bridge (over Boston, Revere Beach, & Lynn Railroad).

Sheathed roadway and painted bridge underneath and top.

Carpenters	\$40 00
Painters	149 00
Lumber	68 12
Nails	4 50
Paint stock	99 99
Car-fares	7 40

369 01

Longwood-avenue bridge (from Roxbury to Brookline).

Repaired sheathing and sidewalk, and put in new wheel-guard.

Carpenters	\$33 50
Watchman	5 00
Lumber	22 87
Nails	2 25

63 62

Shawmut-avenue bridge (over Boston & Albany Railroad).

Sheathed roadway.

Carpenters	\$93 57
Lumber	121 25
Nails	11 25

226 07

Swett-street bridge (east of New York & New England Railroad).

(For description of work done see "Street Improvements, Aldermanic District No. 7.")

Carpenters	\$25 50
Lumber	8 96

34 46

Swett-street bridge (west of New York & New England Railroad).

Sheathed roadway, put in new deck, new sidewalk, and wheel-guards.

Carpenters	\$132 00
Watchman	15 00
Lumber	181 41
Nails	11 75
Ironwork	18 61

358 77

Carried forward,

\$9,872 79

Brought forward,

\$9,872 79

West Chester-park bridge (over Boston & Albany Railroad).

For description of work done see "Street Improvements, Aldermanic District No. 9.")

Teaming	\$93 00
Cleaning rust	60 00
Ironwork	15 30
Nails	3 15
Rebolting iron, etc.	33 00

204 45

West Chester-park bridge (over New York, New Haven, & Hartford Railroad, Providence Division.)

Put in new deck, sheathed the same, rebuilt two sidewalks and fence, painted bridge underneath and top one coat.

Carpenters	\$618 50
Painters	354 63
Watchman	49 00
Lumber	177 02
Nails	36 00
Ironwork	108 84
Paint stock	140 01
Cleaning rust	60 00
Fixture for tool-house	28 75
Teaming	48 00

1,620 75

West Newton-street bridge (over New York, New Haven, & Hartford Railroad, Providence Division.)

Sheathed roadway and painted bridge underneath.

Carpenters	\$31 93
Painters	26 00
Lumber	73 75
Nails	4 50
Paint stock	15 70

151 88

West Rutland-square (foot) bridge (over New York, New Haven, & Hartford Railroad, Providence Division).

Painted bridge underneath and top.

Painters	\$70 50
Paint stock	16 68

87 18

Williams-street culvert (West Roxbury).

Repaired deck and sheathed the same.

Carpenters	\$7 19
Lumber	16 59

23 78

Carried forward,\$11,960 83

Brought forward,

\$11,960 83

Williams-street bridge (over Stony brook).

Repaired deck where defective and sheathed the same.

Carpenters	\$41 75
Lumber	43 19
Nails	2 25

87 19

Sundry expenditures on Inland Bridges :

Labor, bridge-cleaners	\$1,423 76
Labor on snow	837 41
Teaming snow	189 00
Sundry car-fares, mechanics	89 71
Sand for slippery walks	35 75
Salt	22 40
Bolton-street bridge, small repairs	5 00
Cornwall-street bridge, “	4 86
Brookline-avenue bridge “	4 57

2,612 46

Total expended on Inland Bridges	<u>\$14,660 48</u>
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RECAPITULATION.

*Table showing Expenditures on the Inland Bridges for the Year,
February 1, 1893, to January 31, 1894.*

Name of Bridge.	Repairs, Labor, Lumber, Ironwork, and Painting.
Albany street	\$185 36
Ashland street	228 92
Atlantic avenue (sidewalk)	342 17
Beacon street (over Boston & Albany Railroad)	171 15
Beacon street (over Outlet)	95 15
Berkeley street (over Boston & Albany Railroad)	373 50
Berkeley street (over New York, New Haven, & Hartford Railroad, Providence Division)	2,641 64
Blakemore street	304 66
Boylston street (over Boston & Albany Railroad)	293 04
Broadway (over Boston & Albany Railroad)	212 16
Byron street	212 57
Canterbury street	173 71
Cass street	34 22
Central avenue	58 23
Columbus avenue	156 25
Congress street (plank-walk)	404 83
Cottage street	753 09
Dartmouth street	244 00
Dorchester street	99 48
Elmwood street	126 46

Carried forward,\$7,110 59

<i>Brought forward,</i>	\$7,110 59
Ferdinand street	288 75
Gold street	11 30
Huntington avenue	1,153 85
Hyde Park avenue	96 56
Irvington street	129 18
Jamaica street	30 63
Leyden street	369 01
Longwood avenue	63 62
Shawmut avenue	226 07
Swett street (East)	34 46
Swett street (West)	358 77
West Chester park (over Boston & Albany Railroad),	204 45
West Chester park (over New York, New Haven, &	
Hartford Railroad, Providence Division) . . .	1,620 75
West Newton street	151 88
West Rutland square	87 18
Williams street (culvert)	23 78
Williams street (over Stony brook)	87 19
Sundry expenditures	2,612 46
Total	\$14,660 48

REGULAR MAINTENANCE EXPENSES AT NORTH AND SOUTH YARDS.

NORTH YARD, DISTRICT NO. 1.

<i>Warren Bridge.</i>	
Messenger	\$797 68
Watchman	728 00
Tools for carpenters	131 15
Tools for painters	29 42
Telephone	156 15
Gas	59 71
Steam apparatus	84 58
Two hydraulic jacks	315 00
Painting signs	10 80
Office desk	19 00
Street horses	60 25
Repairing buildings	28 54
Waste	13 20
Ice	6 00
Brooms	5 25
Ladder	6 25
Soap	7 38
Small supplies	72 90
	<hr/>
	\$2,531 26
<i>Carried forward,</i>	<hr/>
	\$2,531 26

Brought forward,

\$2,531 26

STABLE, DISTRICT NO. 1.

Teamster	\$791 25
Hostler	591 50
Feed	337 61
Repairing wagons	82 82
Horse-shoeing	124 50
Repairing harness	78 20
Clipping horses	9 00
Water	20 00
Small supplies	105 49

2,140 37

Amount expended, North Yard and stable .

\$4,671 63

SOUTH YARD, DISTRICT NO. 2.

Foundry Street.

Messenger	\$785 00
Yardman	600 00
Watchmen	1,126 50
Tools for carpenters	124 97
Tools for painters	150 60
Telephone	131 50
Plumbing	364 71
Coal	54 50
Two hydraulic jacks	315 00
Ice	6 00
Painters' locker	46 25
Repairing buildings	478 53
Street horses	40 11
Temporary paint-shop	115 50
Brooms	32 75
Small supplies	102 88
Stock, white-lead and linseed-oil	523 75

\$4,998 55

STABLE, DISTRICT NO. 2.

Teamster	\$813 75
Hostler	780 00
Feed	623 86
Repairing wagons	785 91
Repairing buggy	170 45
Harness and repairs	630 20
Horse-shoeing	212 25
Four horses	1,200 00
Vegetable food	225 00
Clipping horses	33 00
New buggy	200 00

Carried forward,

\$5,674 42

\$4,998 55

<i>Brought forward,</i>	\$5,674 42	\$4,998 55
Water	15 00	
Veterinary service	5 00	
Rent of stable (2 mos.)	100 00	
Two new sleighs	190 00	
Use of buggy	14 00	
Blankets	8 75	
Small supplies	117 09	
	<hr/>	6,124 26
Amount expended, South Yard and stable, .		<u>\$11,122 81</u>

SPECIAL APPROPRIATIONS.

Berkeley-street bridge (over Boston & Albany Railroad).

Building new iron fence on top of girders.		
Iron railing, as agreed	\$400 00	
Labor, altering railing	33 75	
	<hr/>	
Amount expended		<u>\$433 75</u>

Broadway bridge.

Strengthening and improving Broadway Bridge, over Fort Point channel.		
Advertising	\$36 51	
Inspector	124 25	
Lumber (labor on same paid out of regular appropriation)	1,169 28	
Repairing iron gates and fence	317 75	
Contract with W. L. Miller, for work done and material furnished	\$5,337 00	
Extra work ordered :		
Rebuilding old stable and floor,	211 14	
Labor and material in B. & A. R.R. yard	197 14	
Bolts and wrench	38 74	
15 per cent. added	67 05	
	<hr/>	5,851 07
Amount expended		\$7,498 86
Transferred to Bedford and Kingston streets, January 31, 1894		1,220 00
Transferred to sewer between Roslindale and West Roxbury, January 31, 1894		280 00
Balance		1,001 14
		<hr/>
Loan		<u>\$10,000 00</u>

Congress-street bridge guard.

Repairing fender-guard.

Contract with Josiah Shaw, for work done and material furnished	\$1,781 00
Extra work ordered, rebolting low-water spurshore and repairing fender at angles near draw opening	90 00
	<hr/>
Amount expended	\$1,871 00

Appropriation	\$534 31
Furnished from appropriation, Street Improvements, Aldermanic District No. 6	1,336 69
	<hr/>
Total	<u>\$1,871 00</u>

Dover-street bridge (over Fort Point channel).

Advertisements (old iron for sale)	\$51 10
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Congress street.

Building new plank-walk from B street southeasterly.

[See regular appropriation for balance expended.]
(Work uncompleted.)

Carpenters	\$555 25
Lumber	574 49
	<hr/>
	1,129 74

Charged to Street Improvements, Aldermanic District No. 6	<u>\$1,180 84</u>
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West Chester-park bridge (over New York, New Haven, & Hartford Railroad, Providence Division).

[For description of work done, see West Chester-park bridge, regular appropriation.]

Lumber	\$410 22
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Berkeley-street bridge (over New York, New Haven, & Hartford Railroad, Providence Division).

Laid new concrete sidewalk on southerly side.

[For balance of description of work done, see Berkeley-street bridge, regular appropriation.]

Lumber	323 19
New concrete sidewalk	553 19
	<hr/>
	876 38

Charged to Street Improvements, Aldermanic District No. 5	<u>\$1,286 60</u>
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Swett-street bridge (east of New York & New England Railroad).

Sheathed roadway, laid new deck, built new sidewalks and wheel-guards.

Carpenters	\$398 50
Lumber	825 25
Nails and spikes	30 55

\$1,254 30

Swett-street bridge (west of New York & New England Railroad).

[For description of work done, see Swett-street bridge, regular appropriation.]

Carpenters	\$12 25
Lumber	24 14
Nails and spikes	2 25

38 64

Charged to Street Improvements, Aldermanic District No. 7

\$1,292 94

West Chester-park bridge (over Boston & Albany Railroad).

Sheathed roadways, put in new deck, laid new concrete sidewalks on both sides, and painted bridge underneath and top.

Carpenters	\$1,545 67
Painters	593 75
Watchman	87 50
Granite work	1,150 54
Lumber	1,057 29
Nails	33 45
Ironwork	53 34
Paint stock	130 00
Cement, sand, etc.	16 13
New concrete sidewalks	246 59

Charged to Street Improvements, Aldermanic District No. 9

\$4,914 26

RECAPITULATION.

Amounts charged to Special Appropriations:

Berkeley-street Bridge	\$433 75
Broadway Bridge	7,498 86
Congress-street Bridge guard	534 31
Street Improvements, Aldermanic District No. 6	2,517 53
“ “ “ “ No. 5	1,286 60
“ “ “ “ No. 7	1,292 94
“ “ “ “ No. 9	4,914 26

Total \$18,478 25

LIST OF BOSTON BRIDGES.

I. — BRIDGES WHOLLY SUPPORTED BY BOSTON.

In the list those marked with an asterisk are over navigable waters, and are each provided with a draw.

Agassiz road, in Back Bay Fens.

Allston, over Boston & Albany Railroad at Cambridge street, Brighton.

Ashland street, over N. Y., N. H., & H. Railroad, Providence Division, West Roxbury.

Athens street, over N. Y. & N. E. Railroad.

Beacon entrance, Back Bay Fens, over Boston & Albany Railroad.

Beacon street, over outlet to Back Bay Fens.

Beacon street, over Boston & Albany Railroad.

Berkeley street, over Boston & Albany Railroad.

Berkeley street, over N. Y., N. H., & H. Railroad, Providence Division.

Blakemore street, over N. Y., N. H., & H. Railroad, Providence Division, West Roxbury.

Bolton street, over N. Y. & N. E. Railroad.

Boylston street, over Boston & Albany Railroad.

Boylston street, over outlet to Back Bay Fens.

*Broadway, over Fort Point Channel.

Broadway, over Boston & Albany Railroad.

Brookline avenue, over Boston & Albany Railroad.

Byron street, over Boston, Revere Beach, & Lynn Railroad.

*Castle Island, from Marine park, South Boston, to Castle Island.

*Charles river, from Boston to Charlestown.

*Chelsea (South), over South Channel, Mystic river.

*Chelsea street, from East Boston to Chelsea.

Columbus avenue, over Boston & Albany Railroad.

*Commercial Point, or Tenean, Dorchester.

Commonwealth avenue, over outlet to Back Bay Fens.

*Congress street, over Fort Point Channel.

Cornwall street, over Stony brook, West Roxbury.

Cottage Farm, Brighton.

Cottage-street foot-bridge, over flats, East Boston.

Dartmouth street, over Boston & Albany, and Providence Division of N. Y., N. H., & H. Railroad.

*Dover street, over Fort Point Channel.

*Federal street, over Fort Point Channel.

Fen, Back Bay Fens.

Ferdinand street, over Boston & Albany Railroad.

Franklin-street foot-bridge, over Boston & Albany Railroad.

Gold-street foot-bridge, over N. Y. & N. E. Railroad.

Huntington avenue, over Boston & Albany Railroad.

Irvington-street foot-bridge, over N. Y., N. H., & H. Railroad, Providence Division.

*L street, over Reserved Channel at junction of Congress and L streets.

Leyden street, over Boston, Revere Beach, & Lynn Railroad.

Linden Park street, over Stony brook.

*Malden, from Charlestown to Everett.

*Meridian street, from East Boston to Chelsea.

*Mt. Washington avenue, over Fort Point Channel.

Neptune road, over Boston, Revere Beach, & Lynn Railroad.

Public Garden foot-bridge.

Shawmut avenue, over Boston & Albany Railroad.

Stony Brook, Back Bay Fens.

Swett street, east of N. Y. & N. E. Railroad.

Swett street, west of N. Y. & N. E. Railroad.

*Warren, from Boston to Charlestown.

West Chester park, over Boston & Albany Railroad.

West Chester park, over N. Y., N. H., & H. Railroad, Providence Division.

West Newton street, over N. Y., N. H., & H. Railroad, Providence Division.

West Rutland square foot-bridge, over N. Y., N. H., & H. Railroad, Providence Division.

Winthrop, from Breed's Island to Winthrop.

II. — BRIDGES OF WHICH BOSTON SUPPORTS THE PART WITHIN ITS LIMITS.

*Cambridge street, from Brighton to Cambridge.

Central avenue, from Dorchester to Milton.

*Chelsea (North), from Charlestown to Chelsea.

*Essex street, from Brighton to Cambridge.

*Granite, from Dorchester to Milton.

Longwood avenue, from Roxbury to Brookline.

Mattapan, from Dorchester to Milton.

Milton, from Dorchester to Milton.

*Neponset, from Dorchester to Quincy.

*North Beacon street, from Brighton to Watertown.

*North Harvard street, from Brighton to Cambridge.

Spring street, from West Roxbury to Dedham.

*Western avenue, from Brighton to Cambridge.

*Western avenue, from Brighton to Watertown.

III. — BRIDGES OF WHICH BOSTON PAYS A PART OF THE COST OF MAINTENANCE.

Albany street, over Boston & Albany Railroad.

Dorchester street, over N. Y., N. H., & H. Railroad, Plymouth and Taunton Division.

Everett street, over Boston & Albany Railroad, Brighton.

- *Harvard, from Boston to Cambridge.
- *Canal, from Boston to Cambridge.
- *Prison Point, from Charlestown to Cambridge.
- *West Boston, from Boston to Cambridge.

The last four bridges are in the care of two Commissioners, one of whom is appointed by the City of Cambridge and the other by the City of Boston.

IV. — BRIDGES SUPPORTED BY RAILROAD CORPORATIONS.

1st. — Boston & Albany Railroad.

Harrison avenue.
Market street, Brighton.
Tremont street.
Washington street.

2d. — Boston & Maine Railroad, Eastern Division.

Mystic avenue.
Main street.

3d. — Boston & Maine Railroad, Western Division.

Mystic avenue.
Main street.

4th. — Boston, Revere Beach, & Lynn Railroad.

Everett street.

5th. — New York & New England Railroad.

Dorchester avenue.
Harvard street, Dorchester.
Morton " "
Norfolk " "
Norfolk " "
Silver street.
Washington street, Dorchester.
West Broadway.
West Fifth street.
West Fourth street.
West Second street.
West Sixth street.
West Third street.

6th. — New York, New Haven, & Hartford Railroad, Plymouth and Taunton Division.

Adams street.
Ashmont street and Dorchester avenue.
Cedar Grove Cemetery.
Freeport street.
Savin Hill avenue.

7th. — New York, New Haven, & Hartford Railroad, Providence Division.

Beech street, West Roxbury.
Bellevue street, West Roxbury.
Canterbury street, West Roxbury.
Centre street, or Hog Bridge, West Roxbury.
Centre and Mt. Vernon streets, West Roxbury.
Dudley avenue, West Roxbury.
Park street, West Roxbury.

RECAPITULATION.

I.	Number wholly supported by Boston	55
II.	Number of which Boston supports the part within its limits	14
III.	Number of which Boston pays a part of the cost of maintenance	7
IV.	Number supported by railroad corporations :	
	1. Boston & Albany	4
	2. Boston & Maine, Eastern Division	2
	3. " " Western Division	2
	4. Boston, Revere Beach, & Lynn	1
	5. New York & New England	13
	6. New York, New Haven, & Hartford, Plymouth and Taunton Division	5
	7. New York, New Haven, & Hartford, Providence Division	7
	Total number,	110

The existing regulations for the passage of vessels through drawbridges have been posted on the several bridges, as required by law.

The records of the number of draw-openings, vessels passing through the bridges, time of passage, kind of vessels, number laden with cargo, etc., as kept by the draw-tenders of the several bridges, have been tabulated, and the totals are given in the summary, which will be found in Appendices A1 and A6.

A list of widths of openings for vessels in all bridges provided

with draws in the city, measurements being furnished by the City Engineer, will be found in Appendix A2.

Appendix A3 is a table, also made by the City Engineer, showing widths of bridges, kind of roadways, sidewalks, etc.

A list of culverts and small bridges will be found in Appendix A4.

Appendix A5 contains a tabulated statement of traffic.

APPENDIX A1.

DRAW-TENDERS' REPORTS.

Giving the Number of Vessels passing through the Drawbridges controlled by the City of Boston, from February 1, 1893, to January 31, 1894.

NAME OF BRIDGE.	STEAMERS.			SAILING-VESSELS.			TUGS.			ALL OTHERS.			TOTAL NO. VESSELS.			Total No. of Car-goes.	Total No. of Open-ings.
	By Day.	By Night.	Total.	By Day.	By Night.	Total.	By Day.	By Night.	Total.	By Day.	By Night.	Total.	By Day.	By Night.	Total.		
Broadway	5	3	8	1,966	993	2,959	1,599	241	1,840	522	142	664	4,092	1,379	5,471	1,758	4,118
Cambridge street				140	9	149	578	30	608	178	8	186	896	47	943	151	567
Charles river	19	11	30	1,928	762	2,690	2,515	660	3,175	1,786	566	2,352	6,248	1,999	8,247	2,450	5,871
Chelsea (North)	47	10	57	794	104	898	3,109	313	3,422	1,518	179	1,697	5,468	606	6,074	1,069	3,985
Chelsea (South)	72	8	80	1,026	104	1,130	2,364	176	2,540	1,244	84	1,328	4,706	372	5,078	1,286	3,835
Chelsea street				14		14	35		35	20		20	69		69	12	62
Commercial Point																	
Congress street	246	115	361	3,495	1,176	4,671	6,074	1,337	7,411	2,154	540	2,694	11,969	3,168	15,137	3,453	7,880
Dover street	4	2	6	1,612	803	2,415	1,297	277	1,574	458	160	618	3,371	1,242	4,613	1,623	3,713
Essex street	23		23	177	3	180	694	23	717	209	9	218	1,103	35	1,138	201	742

Federal street	6	3	9	2,129	1,070	3,199	1,851	380	2,231	543	160	703	4,529	1,613	6,142	1,979	4,910
Granite				107	2	109	233	4	237	24		24	364	6	370	67	246
Malden	5		5	231	29	260	1,004	103	1,107	429	49	478	1,669	181	1,850	354	1,145
Meridian street	27	17	44	685	86	771	3,262	474	3,736	1,399	347	1,746	5,373	924	6,297	1,159	4,213
Mt. Washington avenue . . .	56	23	79	2,685	1,137	3,822	3,796	945	4,741	1,563	526	2,089	8,109	2,631	10,731	2,890	6,314
Neponset				127	4	131	240	4	244	30	1	31	397	9	406	77	277
North Beacon street	1		1				1		1				2		2		2
North Harvard street				52	2	54	127	4	131	35	1	36	214	7	221	38	139
Warren	5	2	7	1,237	1,418	2,655	1,333	650	1,983	968	552	1,520	3,543	2,622	6,165	2,021	5,234
Western avenue to Cambridge,				127	5	132	461	20	481	131	6	137	719	31	750	120	449
Western avenue to Watertown,				6		6	17	1	18	13	1	14	36	2	38	3	32
Totals	516	194	710	18,538	7,707	26,245	30,590	5,612	36,232	13,224	3,331	16,555	62,868	16,874	79,742	20,711	53,734

NOTE. — West Boston, Prison Point, Canal (or Craigie's), and Harvard Bridges not included in these tables, being in the care of Commissioners representing the two cities (Boston and Cambridge) connected by these bridges.

APPENDIX A2.

Table showing the Widths of Openings for Vessels in all Bridges provided with Draws, in the City of Boston, January, 1894.

NAME OF BRIDGE.	Location.	Number of Openings.	Width.
Boston & Maine R.R., Eastern Division	Boston to Charlestown .	1	35 feet 10 inches.
Boston & Maine R.R., Eastern Division	Over Miller's river . . .	1	35 " 11 "
Boston & Maine R.R. (freight), Southern Division	Boston to East Cambridge	1	40 " 4 "
Boston & Maine R.R. (passenger), Southern Division	" " " "	1	35 " 10 "
Boston & Maine R.R., Western Division	Boston to Charlestown .	1	39 " 7 "
Boston & Maine R.R., Western Division	Over Miller's river . . .	1	35 " 9 "
Broadway	Over Fort Point channel,	1	43 " 3 "
Cambridge street	Brighton to Cambridge .	1	36 " 3 "
Canal (or Craigie's)	Boston to East Cambridge	1	35 " 11 "
Charles river	Boston to Charlestown .	1	36 " 0 "
Chelsea (south channel)	Charlestown to Chelsea .	1	38 " 9 "
Chelsea (north channel)	" " " "	1	44 " 10 "
Chelsea st. (East Boston side) . .	East Boston to Chelsea .	2	33 " 1 "
" " (Chelsea side)	" " " "	. .	34 " 3 "
Commercial point (or Tenean) . .	Dorchester	1	24 " 0 "
Congress street (Boston side) . .	Over Fort Point channel,	2	43 " 3 "
" " (South Boston side) . .	" " " "	. .	43 " 11 "
Dover street	" " " "	. .	Rebuilding.
Essex street	Brighton to Cambridge .	1	35 feet 9 inches.
Federal street	Over Fort Point channel,	1	41 " 10 "
Fitchburg R.R.	Boston to Charlestown .	1	36 " 0 "
" " (for teaming freights)	" " " "	1	35 " 11 "

Table showing Width of Openings, etc. — *Concluded.*

NAME OF BRIDGE.	Location.	Number of Openings.	Width.
Grand Junction R.R.	Brighton to Cambridge .	1	35 feet 9 inches.
“ “ “	East Boston to Chelsea .	1	34 “ 7 “
Granite	Dorchester to Milton . .	1	36 “ 0 “
Harvard (Boston side)	Boston to Cambridge . .	2	36 “ 6 “
“ (Cambridge side) . . . . .	“ “ “ . . . . .	..	36 “ 8 “
L street	Over Reserved channel, South Boston	1	40 “ 0 “
Malden	Charlestown to Everett .	1	43 “ 4 “
Meridian st. (East Boston side) . .	East Boston to Chelsea .	2	59 “ 2 “
“ “ (Chelsea side) . . . . .	“ “ “ “ . . . . .	..	59 “ 0 “
Mt. Washington ave. (Boston side) .	Over Fort Point channel,	2	42 “ 3 “
“ “ “ (South Boston side) . . . . .	“ “ “ “ . . . . .	..	42 “ 3 “
Neponset	Dorchester to Quincy . .	1	36 “ 0 “
New York & New England R.R. (Boston side)	Over Fort Point channel,	2	41 “ 10 “
New York & New England R.R. (South Boston side) . . . . .	“ “ “ “ . . . . .	..	40 “ 5 “
New York & New England R.R. . .	Over South Bay	1	28 “ 4 “
North Beacon street	Brighton to Watertown .	1	30 “ 2 “
North Harvard street	Brighton to Cambridge .	1	36 “ 0 “
New York, New Haven, & Hart- ford R.R.	Over Fort Point channel,	1	36 “ 4 “
New York, New Haven, & Hart- ford R.R.	Dorchester to Quincy . .	1	36 “ 0 “
Prison Point	Charlestown to Cam- bridge	1	36 “ 0 “
Warren	Boston to Charlestown .	1	36 “ 2 “
West Boston (Boston side)	Boston to Cambridge . .	2	35 “ 7 “
“ “ (Cambridge side) . . . . .	“ “ “ “ . . . . .	..	36 “ 3 “
Western avenue	Brighton to Cambridge .	1	36 “ 0 “
“ “	Brighton to Watertown .	1	35 “ 10 “

APPENDIX A3.

Table showing Width of Bridges, Kind of Roadways, Sidewalks, etc., on Tide-water Bridges, 1894.

NAME OF BRIDGE.	Width of Bridge.	ROADWAY.		SIDEWALKS.	
		Width.	Kind of Roadway.	No.	Kind of walks.
	<i>Ft. In.</i>	<i>Ft. In.</i>			
Broadway	60 0	40 0	Plank	2	Coal-tar concrete.
Cambridge street	40 0	33 2	"	1	Plank.
Canal	64 0	48 0	Paved	2	Brick.
Charles river	50 0	30 2	"	2	"
Chelsea, North	49 0	40 0	"	1	Coal-tar concrete.
" South	50 0	43 0	"	2	" "
" street	30 2	24 0	Plank	1	Plank.
Commercial Point	about 34 0	about 37 0	"		
Congress street	60 0	44 0	Paved	2	Coal-tar concrete.
Dover street (rebuilding).					
Essex street	31 0	22 8	Plank	1	Plank.
Federal street	69 0	49 0	Paved	2	Asphalt.
Granite	30 2	24 4	Plank	1	Plank.
Harvard	69 4	51 0	"	2	Asphalt.
L street	60 0	34 0	Paved	2	"
Malden	40 0	32 0	"	1	Coal-tar concrete.
Meridian street	50 0	36 0	"	2	" "
Mt. Washington avenue . .	61 0	39 6	"	2	" "
Neponset	30 0	23 10	Plank	1	Plank.
North Beacon street . . .	31 0	25 2	"	1	"
North Harvard street . . .	28 2	26 7	"		
Prison Point	50 0	36 0	{ Plank part } { Paved part }	2	Coal-tar concrete.
Warren	80 0	60 0	Paved	2	" "
W avenue to Cambridge . .	33 2	26 3	Plank	1	Plank.
" " " Watertown . . .	33 0	24 2	"	1	"
Winthrop	24 2	19 10	"	1	"
West Boston	50 0	36 0	Paved	2	Brick.

APPENDIX A4.

List of Culverts and Small Bridges.

Those marked with (*) are over Stony Brook.

LOCATION.	Span. Feet.	Height of Opening. Feet.	Length. Feet.	Side-walls.	Covering.	Depth of Covering. Feet.
Adams street, south of Park, Dorchester	5.0	4.0	57	Stone	Stone	5.0
*Amory street, near Centre, West Roxbury	each 9.0	each 8.0	35	Double stone arch	Stone	8.0
*Ashland and Canterbury streets, West Roxbury	7.0	4.0	25	Stone arch	Stone	3.0
*Ashland street and Canterbury, West Roxbury	7.6	5.5	75	Stone	Wood.	
Ashland street, near Florence, West Roxbury	3.0	3.0	50	Stone	Stone	6.0
Ashland street, 200 feet from Canterbury, West Roxbury	3.0	3.0	50	Stone	Stone	3.0
Back street, near Morton, Dorchester	5.0	4.0	30	Stone	Stone	2.0
Baker street, at Brook Farm, West Roxbury	15.0	5.0	30	Stone	Wood.	
Baker street, opposite Prospect avenue, West Roxbury	2.67	2.67	60	Stone	Stone	1.0
Beech street, near Auawan avenue, West Roxbury	4.0	4.0	50	Stone	Wood.	
Beech street, near Poplar, West Roxbury	1.5	2.5	40	Stone	Stone	5.0
Blue Hill avenue, Dorchester	2.75	1.67	225	Stone	Stone	2.0
Blue Hill avenue, near Morton street, Dorchester	9.0	7.0	60	Stone	Wood.	
*Boylston avenue, West Roxbury	15.0	9.5	30	Stone	Wood.	

List of Culverts and Small Bridges. — *Continued.*

LOCATION.	Span. <i>Feet.</i>	Height of Opening. <i>Feet.</i>	Length. <i>Feet.</i>	Side-walls.	Covering.	Depth of Covering. <i>Feet.</i>
*Boylston street, at Boylston Station, West Roxbury	each 7.0	9.0 & 8.0	47	Double brick arch.	Brick.	
Brighton avenue, west of Babcock street, Brighton	3.5	3.0	50	Stone	Stone	1.25
Brighton avenue, West of Essex street, Brighton	3.0	3.0	50	Wood	Wood and earth.	8.0
Canterbury street, near Morton, West Roxbury	2.0	3.0	40	Stone	Stone	4.0
Canterbury street, near Neponset avenue, West Roxbury	10.0	5.0	42	Stone arch	Stone	3.0
Canterbury street, near Poplar, West Roxbury	2.5	2.5	50	Stone	Stone	8.5
Centre street, near Spring, West Roxbury	4.0	4.0	50	Stone	Stone	3.0
Centre street, near Walter, West Roxbury	2.5	3.0	50	Stone	Stone	5.0
Centre street, at Williams farm, West Roxbury	4.0	4.0	50	Stone arch	Stone	4.0
Centre street, at Williams farm, West Roxbury	1.5	3.0	50	Stone	Stone	5.0
Centre street, corner Willow, West Roxbury	2.5	2.5	60	Stone	Stone	4.5
Church street, west of Weld, West Roxbury	2.67	4.5	65	Stone	Stone	3.0
Corey street, near Highland station, West Roxbury	2.5	3.0	45	Stone	Stone	2.0
Everett street, near B. & A. R.R., Brighton	3.0	2.0	65	Stone	Stone	2.0
Faneuil street, junction of Brooks, Brighton	3.5	3.5	130	Stone	Stone	2.5
Faneuil, West of Parsons, Brighton	4.0	4.83	50	Stone arch	Stone	4.0

Gardner street, near Cow Island, West Roxbury	5.0	5.5	33	Wood	Wood.	
*Green street, at Brookside avenue, West Roxbury	each 10.0	7 0 & 8.0	260	Double stone arch,	Stone	4.0
Harvard avenue, near Washburn street, Brighton	2.67	3.0	58	Stone	Stone	6 0
Harvard avenue, south of Washburn street, Brighton	2.75	3.75	55	Stone	Stone	4.0
*Hyde Park avenue and Washington street, West Roxbury	each 8.0	each 7.0	361 & 93 each, 454	Double stone and brick arch . . . }	Brick and stone,	5.0
*Hyde Park avenue, West Roxbury	19.5	5.0	50	Stone	Wood.	
La Grange street, corner of Pleasant, West Roxbury	3.0	2.0	70	Stone	Stone	1.0
La Grange street, north-west of Weld, West Roxbury	3.0	1.5	90	Stone	Stone	1.5
La Grange street, opp. Mt. Benedict Cem., West Roxbury	2.0	2.5	50	Stone	Stone	2.0
La Grange street, south-east of Weld, West Roxbury	2.0	3.0	50	Stone	Stone	3.0
Lake street, opposite Chandler's pond, Brighton	4.5	4.92	43.85	Stone (double) .	Stone	2.0
Lake street, south of Washington, Brighton	5.5	5.92	40	Stone (double) .	Stone	1.2
Mill street, Dorchester	each 6.75	each 9.5	50	Double stone arch,	Stone	5.0
Morton street, near Austin farm, West Roxbury	4.0	5.0	50	Stone	Stone	2.0
*Morton street, near Washington, West Roxbury	15.0	10.0	50	Stone arch . . .	Stone	4.0
*Mount Hope street, West Roxbury	each 8.0	each 5.0	40	Double stone arch,	Stone	3.0
Mount Hope street, West Roxbury	5.0	4.0	40	Stone arch . . .	Stone	2.0
Neponset avenue, Dorchester	2.5	2.5	60	Wood	Earth and wood,	7.17
Neponset avenue, 500 feet from Hyde Park avenue, West Roxbury .	5.0	4.0	40	Stone arch . . .	Stone	2.0
*Neponset avenue, West Roxbury	14.0	6.0	45	Stone arch . . .	Stone	2.5

List of Culverts and Small Bridges. — *Concluded.*

LOCATION.	Span. <i>Feet.</i>	Height of Opening. <i>Feet.</i>	Length. <i>Feet.</i>	Side-walls.	Covering.	Depth of Covering. <i>Feet.</i>
North Harvard street, near Franklin, Brighton	4.0	2.67	40	Stone	Stone	3.0
Oakland street, south of Faneuil, Brighton	6.0	5.5	39.5	Stone (double) .	Stone and brick,	1.6
Park street, west of Dorchester avenue, Dorchester	5.0	3.67	50	Stone	Wood.	
Park street, west of N. Y., N. H., & H. R. R., Dorchester	8.5	5.0	50	Stone	Wood.	
Parsons street, north of Faneuil, Brighton	4.0	4.0	40	Stone	Stone	15.0
Perkins street, near Jamaica pond, West Roxbury	5.0	4.0	40	Stone arch . . .	Stone	4.0
Poplar street, 500 feet from Beech, West Roxbury	3.0	1.5	110	Stone	Stone	4.5
Poplar street, Roslindale, West Roxbury	7.0	4.0	40	Stone arch . . .	Stone	2.0
Preston street, Dorchester	9.0	5.08	40	Wood	Wood and earth,	4.3
River street and Blue Hill avenue, Dorchester	2.17	2.75	140	Stone	Stone	4.67
River street, Dorchester	3.25	2.5	50	Stone	Stone	1.25
Saratoga street, East Boston	5.0	6.0	50	Oval brick . . .	Brick	6.0
South street, at Arnold Arboretum, West Roxbury	4.5 & 2.0	3.5 & 1.5	30	Double stone . .	Brick	1.5 & 3.5
Spring street, near Spring-street station, West Roxbury	2.67	2.67	63	Stone	Wood.	
Summer street, near Spring-street station, West Roxbury	4.0	4.5	40	Stone	Wood.	
Tencan street, near Fulton, Dorchester	6.25	6.25	40	Wood	Earth and wood,	6.5

*Texas street, off Tremont street	14.0	about 8.0	20	Stone	Wood	3.0
Walk Hill street, near Canterbury street, West Roxbury	8.0	4.0	50	Stone arch	Stone	3.0
Walter street, north of Bussey park, West Roxbury	3.0	4.0	60	Stone	Stone	3.0
Washington street, corner Beaumont avenue, Brighton	3.0	3.5	65	Stone	Stone	3.0
*Washington street (Musk-rat Village), West Roxbury	14.0	6.0	40	Stone arch	Stone	4.5
Washington street, near Poplar street, West Roxbury	14.0	5.0	38	Stone	Wood	3.4
*Washington street, near Williams, West Roxbury	each 7.0	each 7.0	70	Double stone arch,	Stone	4.5
Weld street, near La Grange, West Roxbury	2.0	4.0	30	Stone	Stone	4.0
Western avenue, near North Harvard street, Brighton	4.0	3.0	60	Stone	Stone	4.0
*Williams street, West Roxbury	15.5	8.0	40	Stone	Wood	
Williams street, West Roxbury	5.0	5.0	50	Wood	Wood	

APPENDIX A4. — (*Supplement.*)
List of Culverts and Small Bridges built in 1891.

LOCATION.	Span. <i>Feet.</i>	Height of Opening. <i>Feet.</i>	Length. <i>Feet.</i>	Side-walls.	Covering.	Depth of Covering. <i>Feet.</i>
DORCHESTER.						
Blue Hill avenue, near Harvard street	5.0	4.42	85	Stone	Stone	1.5
Harvard street, near Blue Hill avenue	5.0	4.42	45	Stone	Stone	2.0
Bailey street, near Hillside terrace	4.0	3.42	40	Stone	Stone	2.5
Fuller street, " "	4.0	3.42	40	Stone	Stone	1.5
Dorchester avenue, near Van Winkle street	4.0	3.42	60	Stone	Stone	1.5
" " King street	4.5	4.92	60	Stone	Stone	1.5
Carruth street, near Codman street	51.0	5.0	72	Stone	Stone	1.5
Centre street, near Seaborn street	3.0	3.42	40	Stone	Stone	2.0
WEST ROXBURY.						
Sycamore and Florence streets	4.0	3.92	73	Stone	Stone	2.0
Allandale street, near the spring	3.5	3.92	40	Stone	Stone	2.0
" " lower brook	1.5	1.5	40	Pipe	Pipe	2.5
Cornell street, near Washington street	4.0	3.42	41	Stone	Stone	2.5
BRIGHTON.						
Hobart street, near Faneuil street	6.0	7.5	44	Stone	Brick	1.5
Dustin street, near North Beacon street	5.0	5.0	40	Stone	Stone	1.2

List of Culverts and Small Bridges built in 1892.

LOCATION.	Span. <i>Feet.</i>	Height of Opening. <i>Feet.</i>	Length. <i>Feet.</i>	Side-walls.	Covering.	Depth of Covering. <i>Feet.</i>
DORCHESTER.						
Armadine street, 250 ft. from Washington street	2.0	2.0	61.00	Pipe	Pipe	2.0
Ashmont street, 250 ft. west of Adams street	3.0	3.3	50.00	Stone	Stone	2.0
Park street, between Bournside and Upland avenues	3.0	3.0	41.00	Stone	Stone	2.0
Rill street, 165 ft. from Hancock street	3.0	3.3	40.00	Stone	Stone	2.0
Trull street, 165 ft. from Hancock street	3.0	3.3	41.00	Stone	Stone	2.0
WEST ROXBURY.						
Call street, 200 ft. from Keyes street	6.0	4.0	44.00	Stone	Stone	2.0
Hawthorn street and Sycamore street	3.5	3.3	83.00	Stone	Stone	2.0
Sycamore street, near Prospect street	4.0	3.0	200.00	Stone	Stone	2.0
BRIGHTON.						
Commonwealth avenue, 550 ft. east of Malvern street	6.0	6.0	160.00	Stone	Stone	12.5
Commonwealth avenue, 650 ft. west of Essex street	7.0	7.0	304.64	Stone	Stone	10.0

APPENDIX A4. — (*Supplement.*) — *Concluded.*
List of Culverts and Small Bridges built in 1893.

LOCATION.	Span. <i>Feet.</i>	Height of Opening. <i>Feet.</i>	Length. <i>Feet.</i>	Side-walls.	Covering.	Depth of Covering. <i>Feet.</i>
DORCHESTER.						
Armadine street, 500 ft. from Washington street	Double culvert of 18- inch double thick pipe . . . . .	. . . . .	43.45	. . . . .	. . . . .	2.00
Stockton street, 475 feet from Washington street	24-inch double-thick pipe . . . . .	. . . . .	52.70	. . . . .	. . . . .	2.00
Rockwell street, 525 feet from Washington street	24-inch double-thick pipe . . . . .	. . . . .	41.41	. . . . .	. . . . .	3.00
WEST ROXBURY.						
Grove street, 100 feet from Centre street	3.00	3.00	46.90	Stone	Stone	3.50
Forest Hills street, between Peter Parley and Washington streets	24-inch pipe . . . . .	. . . . .	40.80	. . . . .	. . . . .	4.00
South street, 300 feet south-west from Walter street	3.00	5.33	60.00	Stone	Stone	3.50
BRIGHTON.						
Commonwealth avenue, near Reedsdale street	3.00	4.33	150.00	Stone	Stone	3.90
Commonwealth avenue, between Griggs and Allston streets	3.00	4.33	240.00	Stone	Stone	5.00
	3.00	3.33	330.00	Stone	Stone	5.00

APPENDIX A5.

Statement of Traffic on Tuesday, September 5, 1893,
between the hours of 6 A.M. and 7 P.M.

NORTH BRIDGES.

NAME OF BRIDGE.	Foot-passen- gers from Boston.	Foot-passen- gers to Bos- ton.	Teams from Boston.	Teams to Boston.	Horse and electric cars from Boston.	Horse and electric cars to Boston.
Charles River	4,315	4,115	2,335	2,130	. . . . .	. . . . .
Chelsea (North)	910	890	830	719	282	289
Chelsea (South)	2,030	2,347	966	839	287	295
Meridian street	1,251	1,190	687	670	115	106
Warren	5,965	7,670	3,035	3,680	975	1,147

SOUTH BRIDGES.

Broadway	7,980	6,810	2,250	2,475	. . . . .	. . . . .
Congress street	4,020	4,935	2,480	2,330	. . . . .	. . . . .
Federal street	7,210	7,115	2,875	4,051	624	624
Mt. Washington avenue . . .	1,385	1,720	840	1,240	. . . . .	. . . . .

APPENDIX A6.

DRAW-TENDERS' REPORTS.

Giving the Number of Vessels passing through the Drawbridges controlled by the City of Boston, during the Years 1891, 1892, and 1893.

NAME OF BRIDGE.	Steamers.			Sailing-vessels.			Tugs.			All others.			Total number of Vessels.			Totals.
	1891	1892	1893	1891	1892	1893	1891	1892	1893	1891	1892	1893	1891	1892	1893	
Broadway	4	8	8	3,325	3,118	2,959	1,374	1,709	1,840	455	626	664	5,158	5,461	5,471	16,090
Cambridge street	2	.	.	325	236	149	775	733	608	312	269	186	1,414	1,238	943	3,505
Charles river	44	29	30	3,231	2,800	2,690	2,907	2,854	3,175	2,144	2,010	2,352	8,326	7,693	8,247	24,263
Chelsea (North)	124	35	57	981	717	898	4,109	2,899	3,422	2,503	1,205	1,697	7,717	4,856	6,074	18,647
Chelsea (South)	8	85	80	1,016	1,037	1,130	3,023	2,923	2,540	1,460	986	1,328	5,507	5,031	5,078	15,616
Chelsea street . . . . .	.	.	.	.	4	14	.	36	35	32	14	20	32	54	69	155
Commercial Point . . . . .	.	.	.	.	.	.	.	.	.	2	4	.	2	4	.	6
Congress street	294	298	361	5,132	4,896	4,671	7,064	7,647	7,411	2,522	2,834	2,694	15,012	15,675	15,137	45,824
Dover street	13	10	6	2,652	2,557	2,415	1,211	1,507	1,574	425	544	618	4,301	4,616	4,613	13,530
Essex street	4	13	23	403	247	180	1,054	704	717	537	287	218	1,998	1,251	1,138	4,387
Federal street	2	10	9	3,538	3,295	3,199	1,660	2,044	2,231	690	646	703	5,890	5,995	6,142	18,027
Granite street . . . . .	.	.	.	100	91	109	219	183	237	37	1	24	356	294	370	1,020

Malden	2	3	5	352	215	260	1,267	979	1,107	453	473	478	2,074	1,670	1,850	5,594
Meridian street	84	74	44	757	851	771	2,521	3,351	3,736	1,137	1,432	1,746	4,499	5,708	6,297	16,504
Mt. Washington avenue . . .	89	70	79	4,102	3,923	3,822	4,775	5,094	4,741	1,824	2,199	2,089	10,790	11,286	10,731	32,807
Neponset . . . . .	.	.	.	167	193	131	237	198	244	.	.	31	404	391	406	1,201
North Beacon street . . . . .	.	1	1	.	.	.	1	3	1	.	.	.	1	4	2	7
North Harvard street . . . . .	.	.	.	138	120	54	243	272	131	23	39	36	404	431	221	1,056
Warren	47	17	7	3,108	2,796	2,655	1,950	1,940	1,983	1,757	1,470	1,520	6,862	6,223	6,165	19,250
Western ave. to Cambridge . .	2	.	.	236	211	132	591	619	481	278	228	137	1,107	1,058	750	2,915
Watertown ave. to Watertown .	.	1	.	5	12	6	18	15	18	14	.	14	37	28	38	103
Totals	719	654	710	29,568	27,319	26,245	34,999	35,709	36,232	16,605	15,285	16,555	81,891	78,967	79,742	240,800

¹ West Boston, Prison Point, Canal (or Craigie's), and Harvard Bridges not included in these tables, being in the care of commissioners representing the two cities (Boston and Cambridge) connected by these bridges.

APPENDIX B.

REPORT OF DEPUTY SUPERINTENDENT OF
PAVING DIVISION.

OFFICE PAVING DIVISION,
ROOM 41, CITY HALL, BOSTON, February 1, 1894.

H. H. CARTER, *Superintendent of Streets*:

DEAR SIR: The following report is submitted, showing the expenditures of this division from February 1, 1893, to January 31, 1894, the nature of the work, the number and variety of permits issued, and the details of expenditures involved in paving, macadamizing, and regulating the various streets.

The following list shows the total yearly expenditures of the Paving Division, according to the report of the Superintendent of Streets, for the last thirty-eight years, the expenditures being from January 1 to December 31, inclusive, of each year, except of 1891, that year extending to January 31, 1892, making a period of thirteen months, the years after extending from February 1 to January 31:

1856	. . .	\$192,458 48	1876	. . .	\$980,741 42
1857	. . .	201,528 49	1877	. . .	1,077,475 81
1858	. . .	187,160 92	1878	. . .	644,821 76
1859	. . .	186,295 77	1879	. . .	727,340 05
1860	. . .	197,170 63	1880	. . .	1,015,063 06
1861	. . .	176,978 76	1881	. . .	966,366 49
1862	. . .	175,931 68	1882	. . .	1,088,551 14
1863	. . .	151,130 27	1883	. . .	934,656 58
1864	. . .	156,959 65	1884	. . .	1,310,172 16
1865	. . .	173,258 13	1885	. . .	1,018,693 39
1866	. . .	244,953 55	1886	. . .	1,170,863 01
1867	. . .	283,641 56	1887	. . .	1,260,530 03
1868	. . .	407,053 89	1888	. . .	1,043,475 52
1869	. . .	667,817 90	1889	. . .	1,051,460 18
1870	. . .	804,384 89	1890	. . .	1,061,722 40
1871	. . .	923,312 37	1891	. . .	1,991,524 28
1872	. . .	1,010,508 48	1892	. . .	1,972,857 88
1873	. . .	931,019 01	1893	. . .	1,552,913 17
1874	. . .	1,683,848 67			
1875	. . .	1,062,408 55			
			Total	. .	\$30,687,099 98

STREET NUMBERING.

Numbers have been assigned to the estates in the different districts as follows :

South Boston	Parts of 24 streets.
East Boston	5 streets and parts of 18 streets.
Charlestown	Parts of 13 streets.
Brighton	5 streets and parts of 22 streets.
West Roxbury	3 streets and parts of 25 streets.
Dorchester	7 streets and parts of 44 streets.
Roxbury	12 streets and parts of 67 streets.
City Proper	2 streets and parts of 41 streets.
Total	34 streets and parts of 254 streets.

PERMITS.

Permits to make openings in the streets of the city, between Feb. 1, 1893, and Feb. 1, 1894, have been issued as follows :

Company.	Permits.	Feet.
American Telegraph Co.	5	15
Boston Electric Light Co.	117	388
Boston Gas Light Co.	759	24,868
Boston Water Department	3,519	124,037
Boston Water Department (Mystic)	97	3,383
Brookline Gas Light Co.	4,167	650,106
Brookline Water Board	1	2,250
Boston & Maine Railroad Co.	20	538
Charlestown Gas Light Co.	64	1,545
Commercial Cable Co.	4	20
Dorchester Gas Light Co.	367	23,343
Edison Electric Illuminating Co.	794	54,498
East Boston Gas Light Co.	146	2,951
Fire Alarm Department	68	242
Fitchburg Railroad Co.	1	30
Jamaica Plain Gas Light Co.	206	18,961
New England Telegraph & Telephone Co. of Massachusetts	1,487	26,636
New England Telegraph Co.	5	17
Norfolk Suburban Railway Co.	34	1,899
New York & New England Railroad Co.	10	765
Old Colony Railroad (N.Y., N.H., & H. R.R.)	17	1,042
Postal Telegraph Cable Co.	6	18
Park Department	8	381
Roxbury Gas Light Co.	379	13,756
Sewer Division	191	36,738
Saucier Bros.	1	120
South Boston Gas Light Co.	227	6,264
Standard Oil Co., of New York	114	1,980
Union Freight Railway Co.	3	8,800
West End Street Railway Co.	642	91,778
Western Union Telegraph Co.	4	155
Miscellaneous	3,046	79,2530
	16,519	1,176,777
		or 222 $\frac{5}{8}$ miles.

In addition to the foregoing permits, there have been issued seventy-nine emergency permits, on which there have been made 2,199 openings, at an average length of about six feet each. A record of these openings is on file in the office.

Other permits have been granted as follows:

Advertising by a man wearing hat and coat	11
Cleaning snow from roofs of buildings	99
Driving cattle	36
Distributing sand	33
Erecting awnings	287
Erecting and repairing buildings	6,070
Moving buildings	49
Occupying sidewalks for more than ten minutes to unload or load goods	170
Peddlers (four different classes)	1,028
Raising and lowering safes, machinery, etc.	385
Special to Sewer Division	10
Special for various purposes	205
To feed or bait horses on the streets	1,747
Watering-carts	121
<hr/>	
Making a total of	26,928

There have been 9,920 notices sent to the various foremen to repair defects in the streets which have been reported by the police and otherwise; also 1,531 to private parties to repair defects in Hyatt lights, coal-holes, and work which had been improperly done under permits granted them.

Under the provision of the Revised Ordinances (Sect. 8, Chap. 36), at the same time notices were sent to the various parties, an order was sent to the district foreman directing him to make the necessary repairs in case the parties so notified had failed to do so within the specified time, charging the expense to the person notified.

The system seems to be a good one, as 1,509 such orders were sent, and comparatively few have been returned with expense incurred.

There have been 1,350 notices sent to the department, various corporations, and citizens regarding contemplated street improvements during the year.

There have been about 200 new bonds filed during the year.

There have been 700 requests sent to the Police Department, asking for information regarding locations where persons have asked for permits to sell goods from areas and windows, or to occupy the sidewalk for more than ten minutes to load or unload goods, all of which have been returned with the desired information, and if favorable and no objections were found the permits have been granted.

Streets Laid Out or Extended.

DATE.	Street.	Location.	Length in Feet.
Mar. 13,	Lewis st.	North st. to Moon st.	200
May 11,	Batavia st.	St. Stephen to Parker st.	926
May 15,	Miner st.	Beacon st. to Brookline branch B. & A. R.R.	304
May 16,	Howard st. ...	To Magazine st.	121
May 16,	Hewlett st.	Centre st. to Walter st.	1,657
May 22,	Gannett st.	Holborn st. to Gaston st.	467
June 7,	Deerfield st. ...	Commonwealth ave. to Charles river,	518
June 7,	Bay State road	Sherborn st. to Deerfield st.	802
May 22,	Chambers st. ...	Spring st. to Brighton st.	264
July 19,	Alcott st.	Franklin st. to Mansfield st.	484
July 31,	Glenway st. ...	Old road to Glen ave.	1,039
Aug. 10,	Weld Hill st. ...	Hyde Park ave. to Forest Hill Cemetery.	1,012
Aug. 10,	Bushnell st. ...	Ashmont st. to Dorchester ave.	106
Aug. 10,	Lyon st.	Adams st. to Dorchester ave. ...	839
Aug. 10,	Elko st.	Cambridge st. to Sparhawk st.	459
Aug. 10,	Willis st.	Pleasant st. to Sumner st.	693
Aug. 2,	Tremlett st. ...	Hooper st. to Waldeck st.	559
Aug. 16,	Leicester st. ...	Bennett st. to Arlington st.	263
Aug. 24,	Germania st. ...	Bismarck st. to Boylston st.	658
Oct. 12,	Ruth st.	Angle in said street to Marginal st.	138
Oct. 12,	Hollander st. ..	Harold st. to Humboldt ave.	703
Oct. 12,	Hamerton st. ...	Harold st. to Humboldt ave.	648
Nov. 1,	Edge Hill st. ...	Gay Head st. to Round Hill st.	591
Nov. 1,	Westerly st. ...	Centre st. to Sunnyside st.	359
Nov. 1,	Holworthy st. ..	Harold st. to Humboldt ave.	757
Nov. 2,	Portsmouth st. ..	Waverley st. to Lincoln st.	818
Nov. 10,	Elmira st.	Murdock st. to George st.	641
Nov. 10,	Etna st.	North Beacon st. to Elmira st.	1,120
Nov. 17,	Adelaide st. ...	Boylston st. to Spring Park st.	635
Nov. 17,	Montview st. ...	Corey st. to Mt. Vernon st.	1,368
Nov. 23,	Highgate st. ...	Cambridge st. to Farrington ave. ...	504
Dec. 4,	Selden st.	Milton ave. to Morton st.	1,809
Dec. 4,	Newport st. ...	Harbor View st. to Crescent ave. ...	637
Dec. 5,	Greenheys st. ...	Cedar st. to Magnolia st.	390
Dec. 5,	Hazelwood st. ...	Townsend st. to Munroe st.	364
Dec. 7,	Tolman st.	Neponset ave. to Norwood st.	940
Dec. 7,	St. Alphonsus st.	Tremont st. to Huntington ave.	1,165
Dec. 14,	Lawn st.	Hayden st., easterly, to Heath st. ...	956
Dec. 14,	Duncan st.	Greenwich st. to Leonard st.	664
Dec. 14,	Millet st.	Park st. to Talbot ave.	1,139
Dec. 23,	Harrishof st. ...	Harold st. to Humboldt ave.	807
Dec. 23,	Buttonwood st.	Grafton st. to Crescent ave.	341
Dec. 27,	Robert st.	Brookfield st. to Walter st.	373
Dec. 27,	Brookfield st. ...	South st. to South Fairview st.	463
Dec. 28,	Catherine st. ...	Florence st. to Bourne st.	881
Dec. 29,	Kenmore st. ...	Commonwealth ave. to West Newbury st.	211
Dec. 30,	Pontine st.	Norfolk ave. to Batchelder st.	391
Dec. 30,	Round Hill st. ...	Day st. to Walden st.	1,433
Dec. 30,	Spencer st.	Park st. to Wheatland ave.	643
	Essex pl.	End discontinued.	33,260
		Total	34
		Or 6.293 miles.	33,226

Streets Widened and Relocated.

DATE.	Street.	Location.	Sq. Ft.
Jan. 31,	Commonwealth ave.....	On the southerly cor. Brookline ave.	1,927
Jan. 31,	Commonwealth ave.....	On the northerly side at the junction of Beacon st.	534
Jan. 31,	Beacon st.....	On the southerly side at the junction of Brookline ave.	195
Jan. 31,	Brookline ave..	On the northerly side at the junction of Beacon st.	37
Feb. 16,	Commonwealth ave.....	At Beacon st.....	1,545
April 24,	Essex st.....	Between Chauncy and South sts....	9,150
April 24,	Lincoln st.....	On the easterly side between Essex and Tufts sts.....	854
May 22,	Chambers st...	Between Ashland st. and Spring st.	2,663
Aug. 16,	City sq.....	On the northerly side between Main and Park sts.	18
Aug. 21,	Boston st.....	Northeasterly cor. of Pond st.....	1,386
Sept. 13,	Causeway st...	On the southerly side between Endicott and Prince sts.....	25
Sept. 20,	Hancock st....	Northerly side between Rocky Hill ave. and Dudley st.	959
Sept. 20,	Columbia st....	Northerly side between Bird and Rocky Hill ave.....	4,193
Oct. 16,	Henshaw st....	Between Menlo st. and Washington st.	2,570
Nov. 23,	Harrison ave..	Between Essex and Beach sts.....	10,213
Dec. 7,	Washington st.	From Cambridge st. to Oak sq.....	48,826
Dec. 8,	Poplar st.....	Easterly side between Washington st. and Ashland st.....	5,228
Dec. 29,	Poplar st.....	At Washington st.....	466
			90,789

Streets Discontinued.

DATE.	Street.	Location.	Sq. Ft.
Jan. 6,	Spring lane...	At and near cor. Washington st....	131
July 19,	Essex st.....	Northerly side between Columbia and Lincoln sts... ..	57
Aug. 21,	Pond st.....	Northerly side near and east of Boston st.	1,607
Aug. 26,	Essex place....	South of Tufts st.....	622
Oct. 16,	Henshaw st....	Between Menlo st. and Washington st.	1,324
			3,741

The record of the Street Commissioners for the year 1893 shows the following results :

Streets laid out or extended	. 33,226 lin. ft., or 6.293 miles.
Streets widened and relocated	. 90,789 sq. ft.
Streets discontinued	. 3,741 sq. ft.
Increase in mileage	. 33,226 lin. ft., or 6.293 miles.

FINANCIAL STATEMENT.

APPROPRIATIONS.

Appropriation for 1893-94	\$850,000 00
Amount collected by City Collector for repairs done by Paving Division for different companies, etc.	4,093 74
	<u>\$854,093 74</u>

EXPENDITURES.

Amount of expenditures from February 1, 1893, to January 31, 1894	\$745,681 52
Transferred to Central Office	805 96
Transferred to Sewer Division	40,000 00
Transferred to Sanitary Division	15,000 00
Transferred to Street-Cleaning Division	15,000 00
	<u>816,487 48</u>
Transferred to City Treasury	<u>\$37,606 26</u>
Total expenditures from regular appropriation	\$745,681 52
Total expenditures from street-watering appropriation	99,430 16
Total expenditures from special appropriations	707,801 49
Grand total (regular and special)	<u><u>\$1,552,913 17</u></u>

INCOME.

Statement showing the amount of bills deposited with City Collector from February 1, 1893, to February 1, 1894, on account of the Paving Division :

Sidewalk construction assessments (Law of 1892),	\$18,694 57
Edgestone and sidewalk assessments (Law of 1893),	18,344 93
Old paving-blocks	2,913 64
Repair of streets (Rev. Ord. 1892)	2,912 65
Rent of part of Fort Hill wharf	500 00
Miscellaneous	3,490 13
	<hr/>
	<u>\$46,855 92</u>

The amount paid into the city treasury during the same period on account of the Paving Division is as follows :

Sidewalk construction assessments (Law of 1892),	\$58,008 95
Edgestone and sidewalk assessments (Law of 1893),	10,537 55
Repairs of streets (Rev. Ord. 1892)	989 05
Rent of part of Fort Hill wharf	500 00
Miscellaneous	5,832 05
	<hr/>
	<u>\$75,867 60</u>
In addition to the above amount, there was an income from street-watering of	<u>\$704 52</u>

Table showing Expenses paid from the Regular Appropriation, classified by Districts, from February 1, 1893, to January 31, 1894.

DISTRICTS.	Repairs.	Snow.	Edgestones, Sidewalks, and Crossings.	Fences and Plank-walks.	A. Miscellaneous.	B. Executions of Court.	C. In Excess of Special Appropriation	D. New Work.	Total.
1. So. Boston.....	\$23,993 25	\$11,558 03	\$7,359 43	\$2,193 62	.....	.....	\$1,283 32	.....	\$46,387 65
2. E. Boston.....	15,709 21	6,823 88	6,833 02	770 30	.....	.....	.....	.....	30,136 41
3. Charlestown.....	17,593 78	11,132 69	5,701 59	617 99	.....	.....	.....	.....	35,046 05
4. Brighton	32,476 20	7,679 03	3,944 86	1,147 09	.....	.....	4,220 97	\$9,513 73	58,981 88
5. West Roxbury....	44,108 73	10,109 21	3,949 46	1,787 64	.....	.....	4,830 58	4,117 61	63,903 23
6. Dorchester	52,722 06	13,979 82	3,548 96	2,329 44	.....	.....	7,337 53	1,953 73	81,871 54
7. Roxbury.....	70,273 34	15,621 49	9,162 05	3,195 23	.....	.....	.....	13,493 45	111,745 56
8, 9, 10. City Proper..	101,033 32	74,530 30	30,061 28	4,965 18	.....	.....	1,960 56	.....	212,550 64
11. Roxbury and West Roxbury.....	26,725 81	508 88	917 46	577 77	.....	.....	.....	.....	28,729 92
					\$53,816 43	\$17,512 21	.....	.....	17,512 21
									53,816 43
Total.....	\$384,635 70	\$151,943 33	\$71,478 11	\$17,584 26	\$53,816 43	\$17,512 21	\$19,632 96	\$29,078 52	\$745,681 52

A. See Schedule A for items.

B. See Schedule B for items.

C. This schedule shows amount of money spent in excess of the special appropriation and taken from the maintenance appropriation; for items see Special Appropriations.

D. This schedule shows streets where the repairs have exceeded \$2,000; for items see Schedule D.

SCHEDULE A.

EXPENDITURES. (DETAILS.)

Salary of Charles R. Cutter, Deputy Superintendent of Streets, January 27, 1893, to January 25, 1894 . . .	\$3,500 00
Salary of office clerks	12,312 33
Advertising in and subscribing for daily papers	508 66
Horses, carts, and harnesses (new)	10,724 52
Printing and stationery	3,048 91
Repairing stables, sheds, etc.	2,098 29
Sundries	8,304 98
Street signs and numbering	1,441 08
Telephones, expenses of	1,056 90
Tools, cost of keeping the same in repair, etc.	10,820 76
	<hr/>
	\$53,816 43

SCHEDULE B.

EXECUTIONS OF COURT, ETC.

Aldrich, Warren D., personal injuries	\$1,052 31
Barbier, Gabriel, "	130 81
Beekman, Emma, "	926 11
Bennett, Mrs. C. H., "	150 00
Bidnead, Ann B., "	889 43
Conant, Elizabeth, "	126 44
Conway, Thomas, grade damages	126 77
Cutter, Dr. Charles K., damages to sleigh	40 00
Davy, George A., damages to estate	500 00
Devlin, Joseph, personal injuries	66 00
Drisco, Ormando H., grade damages	796 19
Estabrook, Edward L. and George W., grade damages,	761 33
Fitzgerald, J. R., personal injuries	125 45
Ford, Noah, "	375 78
Ford, Patrick, loss of time on account of injuries received	244 00
Fowlie, James, personal injuries	100 00
Frink, Alden, damage to house	5 00
Fuller, Ellen M., damages to estate	875 92
Gateley, Michael C., personal injuries	100 00
Gray, Mary E., damage to estate	300 00
Harrington, Edmund D. T., injuries to horse	175 00
Horan, Patrick, grade damages	150 00
Kerrigan, Owen, personal injuries	150 00
Keyes, Samuel, injuries to team	25 00
Leonard, Mary, personal injuries	100 00
Nash, Susan W., grade damages	792 64
Newhall, Horatio, grade damages	3,098 41
Sullings, Ada L., personal injuries	300 00
Swift Patrick J., grade damages	2,025 45
Taylor, Abbie, "	796 19
Whittier, Laura E., personal injuries	1,606 87
Woodbury, Louisa, damages to estate	501 11
Woods, Ellen T., Henry E., Herbert, and Arthur L., grade damages	100 00
	<hr/>
	\$17,512 21

SCHEDULE C.

The following schedule shows the expenditure from the maintenance appropriation of this division in excess of special appropriations.

Dorchester street, Eighth street to Dorchester avenue.	
In excess of special appropriations	\$110 78
I street, Fourth to Sixth street .	
In excess of special appropriation	1,127 51
(Aldermanic District No. 7.)	
Vale street, Ward 15.	
In excess of special appropriation	45 03
Englewood avenue, Chestnut Hill avenue to Brook-	
line line, Brighton.	
In excess of special appropriation	3,788 57
Lexington avenue.	
In excess of special appropriation	432 40
La Grange street.	
In excess of special appropriation	1,605 21
Short street, Ward 23.	
In excess of special appropriation	129 00
Washington street.	
In excess of special appropriation	3,096 37
(Aldermanic District No. 11.)	
Brent street.	
In excess of special appropriation	3,177 98
Dorchester avenue, paving, Wards 15 and 24.	
In excess of special appropriation	1,799 55
Harvard street.	
In excess of special appropriation	1,533 00
Harbor View street.	
In excess of special appropriation	50 00
Stanton street.	
In excess of special appropriation	777 00
Arch street.	
In excess of special appropriation	1,447 78
(Aldermanic District No. 4.)	
Bristol street.	
In excess of special appropriation	313 18
Chardon street.	
In excess of special appropriation	60 38
Cooper street, North Margin to Salem Street.	
In excess of special appropriation	127 50
West Newton street, Washington street to Shawmut	
avenue.	
In excess of special appropriation	11 72
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	\$19,632 96
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SCHEDULE D.

NEW WORK.

Dewey street, Ward 20, Blue Hill avenue to Howard avenue.

Length, 887 feet. Grading, heavy rock cuts, 2,562 square yards 8-inch macadam.

Labor	\$1,300 51
Teaming, including rolling	1,563 00
Gravel	771 80
854 tons macadam, at \$1.75	1,494 50

\$5,129 81

Highland street, Ward 21, Dudley to Centre street.

Street repairs, 3,200 sq. yds. 6-in. macadam.

Labor	\$169 75
Teaming, including rolling	449 50
Gravel	325 45
803 tons macadam, at \$1.75	1,405 25

2,349 95

Intervale street, Ward 21, Warren street to Blue Hill avenue.

Length, 603 ft.; area, 1,742 sq. yds. Setting edgestone, paving gutters, brick sidewalks, flagging crossing, resurfacing roadway.

Labor	\$577 13
Teaming, including street-rolling	364 00
Pavers' bills	350 31
Gravel	450 50
Gutter blocks	537 24
Sand	194 40
574 ft. edgestone, at 75 cts.	430 51
10,014 paving brick, at \$13 per thousand	130 18
166.3 ft. flagging, at 90 cts.	149 67
292 tons macadam, at \$1.75	511 00

3,694 94

Huntington avenue, Ward 22, Gainsboro' to Parker street.

Street repairs, 4,080 sq. yds. 6-inch macadam.

Labor	\$145 50
Steam-roller	200 00
Gravel	188 25
1,020 tons macadam, at \$1.75	1,785 00

2,318 75

Poplar Street, Ward 23, at Beech street. Street and sidewalk repairs.

2,244 sq. yds. of 6-inch macadam.

Labor	\$150 75
Teaming, including rolling	262 00
Gravel	698 75
561 tons macadam, at \$1.75	981 75

2,093 25

Carried forward,

\$15,586 70

Brought forward,

\$15,586 70

St. Joseph street, Ward 23, South to Woodman street. Length, 415 feet. Edgestone set, gutters paved, sidewalks gravelled, street macadamized.

922 sq. yds. 4-inch macadam.

Labor	\$369 00
Teaming, including rolling	322 50
819.6 feet edgestone, at 75 cts.	614 70
6 small corners, at \$3.35	20 10
8,136 gutter blocks, at \$27 per thousand	219 67
Pavers' bills	138 85
Gravel	68 29
155 tons macadam, at \$1.75	271 25

2,024 36

Stockton street, Ward 24, Washington street to Milton avenue. Length, 1,285 feet. Unfinished. Grading.

Area, 3,712 sq. yds.

Excavating, 739 cubic yds., at 50 cts.	\$369 50
Labor	16 88
Teaming	51 00
415 double loads rubble, at \$1.50	622 50
474 tons crushed stone, at \$1.75	829 50
Gravel	64 35

1,953 73

Alcott street, Ward 25, Mansfield to Franklin street. Length, 498 feet. Edgestones set, gutters paved, sidewalks gravelled.

1,440 sq. yds. 6-in. macadam roadway.

Labor	\$616 50
Teaming, including rolling	295 50
17,825 gutter blocks, at \$26	463 45
1,026.4 feet edgestone, at 75 cts.	769 80
4 large corners	22 40
4 small corners	13 40
Gravel	782 95
333 tons macadam, at \$1.75	582 75

3,546 75

Cambridge street, Ward 25; street repairs between Allston street and Cambridge bridge.

2,805 sq. yds. 8-in. macadam.

Labor	\$78 75
Roller	300 00
Gravel	426 15
935 tons macadam, at \$1.75	1,636 25

2,441 15

Western avenue, Ward 25; street repairs between Watertown and Cambridge bridge.

5,604 sq. yds. 6-in. macadam.

Labor	\$148 38
Roller	420 00
Gravel	505 70
1,401 tons macadam, at \$1.75	2,451 75

3,525 83

Total \$29,078 52

REMOVAL OF SNOW.

South Boston	\$11,558 03
East Boston	6,823 88
Charlestown	11,132 69
Brighton	7,679 03
West Roxbury	10,109 21
Dorchester	13,979 82
Roxbury	15,621 49
City Proper	74,530 30
Roxbury and West Roxbury (new district)	508 88
	<hr/>
	\$151,943 33

STREET-WATERING.

South Boston	\$7,771 09
East Boston	6,505 57
Charlestown	6,397 58
Brighton	11,859 10
West Roxbury	15,487 36
Dorchester	14,465 37
Roxbury	15,885 57
City Proper	21,058 52
	<hr/>
	\$99,430 16

*DETAIL OF EXPENDITURES MADE UNDER SPECIAL APPROPRIATIONS.***Allston bridge, Ward 25.**

Resetting edgestones, relaying sidewalks, repaving gutters, and resurfacing roadway to approaches.

Labor	\$579 60
Teaming	456 00
Materials	1,468 96
	<hr/>
	\$2,504 56

Baker street, Ward 23, grading and widening.

Labor	\$349 60
Teaming	172 50
Stone	127 50
	<hr/>
	\$649 60

Beacon street, Ward 25 (unfinished work from 1892).

Material	\$108 90
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Brent street, Ward 24, Washington street to Carlisle street.

Length, 1,202 ft. ; 2,670 sq. yds. 18-in. Telford macadam.

Labor	\$664 10
Teaming	376 50
Steam-roller	130 00
Gravel	445 50
Paving	57 89
	<hr/>

Carried forward,

\$1,673 99

<i>Brought forward,</i>		\$1,673 99
Filling		122 90
1,598 tons of macadam		2,796 50
Work done by Sewer Division		110 87
		<u>\$4,704 26</u>
Amount of special appropriation	\$1,526 28	
Amount paid out of Paving Division	3,177 98	
		<u>\$4,704 26</u>

Bristol Street, Ward 17, Harrison avenue to Albany street. Length, 588 feet.

1,217 sq. yds. granite block paving.		
Labor		\$761 78
Teaming		417 00
Brick		39 65
Gravel and sand		211 38
Edgestone		62 15
28,000 large paving blocks		2,058 00
		<u>\$3,549 96</u>
Amount of special appropriation	\$2,869 28	
Amount paid out of Paving Division	313 18	
Amount paid out of Street Improvements, Aldermanic District No. 8	367 50	
		<u>\$3,549 96</u>

Broadway, Ward 12, Harrison avenue to Lehigh-street bridge and Albany street, Broadway to B. & A. R.R. bridge. Resetting edgestone, relaying sidewalks and paving.

2,200 sq. yds. granite block paving.		
Labor		\$2,378 32
Teaming		1,345 50
Gravel		330 31
50,725 large granite blocks		3,728 29
		<u>\$7,782 42</u>
Amount of special appropriation		\$7,782 42

Chardon Street, Ward 8.

Amount retained from Jones & Meehan, on their contract		\$409 83
Amount of special appropriation	\$349 45	
Amount paid out of Paving Division	60 38	
		<u>\$409 83</u>

Cherry Street, Ward 16.

Amount retained from Barber Asphalt Paving Co., on their contract in 1892		\$65 10
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Commonwealth avenue, construction.

Labor, including engineering and inspection	\$39,611 87	
Teaming	8,926 50	
Gravel	1,307 30	
13,571.92 tons of stone	25,109 08	
3,049 double loads of stone	4,573 50	

Carried forward,

\$79,523 25

<i>Brought forward,</i>		\$79,528 25
1,660 cu. yds. of stone		3,735 00
Powder and fuse		361 50
Lumber		715 81
Advertising		298 54
Sundries		994 94
71,706 large granite blocks		5,213 20
48,676 asphalt blocks		1,947 04
341 $\frac{9}{12}$ feet circular edgestone		420 76
4,693 $\frac{7}{12}$ feet straight edgestone		3,896 13
48 perch of wall		216 00
Paid for building bulkhead		850 00
Paid to R. A. Davis, as per contract:		
2,676 cu. yds. filling, at 83 cts.	\$2,221 08	
3,471.9 cu. yds. excavation, at 30 cts.	1,041 57	
6,416.1 sq. yds. Telford base, at 95 cts.	6,095 30	
1,149.2 sq. yds. gutters paved, at 95 cts.	1,091 74	
4132 sq. yds. loam furnished, at 50 cts.	2,066 10	
1,535.8 lin. ft. edgestone, at 45 cts.	691 11	
1,501 lin. ft. plank-walk, at \$1	1,501 00	
1,501 lin. ft. fence, at 50 cts.	750 50	
Extra work as ordered:		
923 loads of stone chips, at \$1.50	1,384 50	
90 days' labor, at \$2	180 00	
18 $\frac{1}{2}$ days, foreman, at \$3	55 50	
4 days, paver, at \$4.50	\$18 00	
5 days, rammer, at \$2.50	12 50	
4 days, tender, at \$2	8 00	
2 days, stonecutter, at \$4.50	9 00	
1 day, single team, at \$3.50	3 50	
10 double loads gravel, at \$2	20 00	
	<u>\$71 00</u>	
Add 15 per cent.	10 65	
		81 65
904 cu. yds. excavation, at 10 cts.	90 40	
3 days watering-cart, at \$6	18 00	
3 days steam-roller, at \$6	18 00	
	<u>\$17,286 45</u>	
Less 5 $\frac{1}{2}$ days' use of steam-roller, at \$10,	55 00	
		17,231 45
Excavation:		
1,131 cu. yds. rock removed, at \$1.48	\$1,969 88	
Labor and teaming	326 00	
	<u>2,295 88</u>	
Paid to Boston Contracting Co., as per contract:		
96,933 cu. yds. of filling, at 37 cts.	35,865 22	
Paid to James H. Seamans, George H. Worthley, and Emery B. Gibbs, trustees:		
96,646 cu. yds. of gravel, at 12 $\frac{1}{2}$ cts.	12,080 75	
Furnishing base:		
5,039 sq. yds. Telford base, at 80 cts.	\$4,031 20	
882 cu. yds. earth cutting, at 45 cts.	396 90	
24 cu. yds. rock, at \$1.48	35 52	
Labor and material	954 99	
	<u>5,418 61</u>	
<i>Carried forward,</i>		\$171,069 08

<i>Brought forward,</i>		\$171,069 08
Paid to F. H. Cowin & Co., as per contract:		
4,740 cu. yds. sub-grading, at 30 cts.	\$1,422 00	
7,521 sq. yds. Telford base, at 79 cts.	5,941 99	
1,293 sq. yds. gutters paved, at 85 cts.	1,099 05	
7,314 sq. yds. loam (unfinished), at 53 cts.,	3,876 42	
1,799 lin. ft. edgestones, at 45 cts.	809 55	
1,685 lin. ft. plank-walk, at \$1.02	1,718 70	
1,685 lin. ft. fence, at 48 cts.	808 80	
Extra work as ordered:		
8½ days, paver, at \$4	34 00	
2 days, roller, at \$3	6 00	
29,223 blocks carted, at \$4 per M	116 89	
2 days' labor, foreman, at \$3.50	7 00	
134½ days' labor, at \$2	268 67	
16 days' single team, at \$3	48 00	
1 day, double team	5 00	
12½ ft. edgestones set, at 20 cts.	2 50	
13 sq. yds. paving gutters, at 40 cts.	5 20	
186½ ft. edgestones reset, at 20 cts.	37 30	
		16,207 07
Land damages		56,527 00
Work done by Sewer Division		23,889 20
		<hr/>
Amount retained from F. H. Cowin & Co.	\$783 83	
Amount retained from R. A. Davis	661 87	
	<hr/>	1,445 70
		<hr/>
		\$266,246 65

Congress and L streets, and L street, grading, from First street to Congress street, Ward 14.

Area, 5,464 sq. yds.

Labor	\$2,876 32
Teaming	700 50
Gravel	1,514 20
Lumber	494 82
Filling	586 50
125,783 large granite blocks	9,245 06
Paid to H. Gore & Co.:	
4,992 sq. yds. block paving	1,248 00
Work done by Sewer Division	981 10
	<hr/>
	\$17,646 50
Amount of appropriation for L-street grad-	
ing	\$2,346 50
Amount paid out of appropriation for Con-	
gress and L streets	15,300 00
	<hr/>
	\$17,646 50

Cooper street, North Margin street to Salem street, Ward 7.

Resetting edgestone, relaying sidewalks, and 452 sq. yds. granite block paving.

Labor	\$437 39
Teaming	334 50
Gravel and sand	72 00

Carried forward,

\$843 89

<i>Brought forward,</i>		\$843 89
Brick		19 50
10,396 large granite blocks		764 11
		<hr/>
Amount of special appropriation	\$1,500 00	\$1,627 50
Amount paid out of Paving Division	127 50	
	<hr/>	<hr/>
		\$1,627 50

Cranston street, Ward 23.

Grading: rock excavation.

Labor	\$982 90
Teaming	126 00
Gravel	49 30
	<hr/>
	\$1,158 20

Dickens street, Adams street to N.Y., N.H., & H. R.R. Depot, Ward 24.

Length, 876 ft. ; 2,531 sq. yds. 9-in. macadam.

997 tons of stone	\$1,495 50
Steam-roller	80 00
Teaming	105 00
Gravel	210 00
Labor	182 71
	<hr/>
	\$2,073 21

Amount of appropriation for Dickens street,	\$785 00	
Amount paid out of appropriation for Street		
Improvements, Aldermanic District No.		
12	1,288 21	
	<hr/>	<hr/>
		\$2,073 21

Dorchester avenue, paving, Wards 15 and 24.

Grading avenue at Milton Lower Mills. Area, 1,148 sq. yds. Heavy rock cut, and 1,148 sq. yds. 12-in. Telford macadam roadway.

Labor	\$2,272 55
Teaming	306 00
Gravel	363 80
Macadam	731 50
Powder and tools	292 42
Steam-roller	150 00
Work done by the Sewer Division	383 65
	<hr/>
	\$4,499 92

Amount of appropriation for Dorchester		
ave.	\$2,700 37	
Amount paid out of Paving Division	1,799 55	
	<hr/>	<hr/>
		\$4,499 92

Dorchester street, Eighth street to Dorchester avenue.

Amount retained from Collins & Ham, on their contract in		
1891		\$496 87
Amount of appropriation for Dorchester		
street	\$386 09	
Amount paid out of Paving Division	110 78	
	<hr/>	<hr/>
		\$496 87

Eighth street, L to O street, Ward 14, gravelling sidewalks and patching street.

Labor	\$1,150 52
Teaming	60 00
Paving	93 44
Macadam	364 54
Gravel	1,022 22
	<hr/>
	\$2,690 72
Amount of appropriation for Eighth street .	\$1,249 69
Amount paid out of Street Improvements, Aldermanic District No. 7	1,441 03
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	<u>\$2,690 72</u>

Englewood avenue, Ward 25, Chestnut Hill avenue to Brookline line, grading.

Length, 1,657 ft. ; 6,260 sq. yds. 6-in. macadam.	
Labor	\$2,611 03
Teaming, including rolling	1,017 00
Steam-roller	140 00
Flagging	141 48
Gravel	1,237 95
Powder and fuse	90 00
1,736 tons of macadam	3,038 00
Work done by Sewer Division	253 06
	<hr/>
	\$8,528 52
Amount of appropriation for Englewood avenue	\$4,739 95
Amount paid out of Paving Division	3,788 57
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	<u>\$8,528 52</u>

Freeport street, Ward 24, Beach to Tenean street.

3,115 sq. yds. block paving; 5,920 sq. yds. 4-inch. macadam.	
Labor	\$1,568 38
Teaming	1,072 50
Gravel	1,042 90
62,542 large granite blocks	4,557 31
Wharfage	107 00
Paving	785 96
Steam-roller	295 00
947 tons cracked stone	1,420 50
	<hr/>
	<u>\$10,849 55</u>

Grant street, Ward 24, grading.

Labor and material	\$241 52
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Harbor View street, Ward 24, repairs.

Labor	\$158 71
Material	454 25
	<hr/>
	\$612 96

Amount of appropriation for Harbor View street	\$562 96
Amount paid out of Paving Division	50 00
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	<u>\$612 96</u>

Harvard street, Ward 24, Washington to School street, grading, gutters paved.

4,584 sq. yds. 12-inch Telford; between School street and Glen road, grading.

Labor	\$2,516 44
Teaming	1,832 95
Gravel	752 40
1,201 tons of macadam	1,801 50
Gutter blocks	677 30
Stone	3,084 10
Steam-roller	250 00
Flagging	319 50
Edgestone	151 31
Paving	189 90
Lumber	18 98
Work done by the Sewer Division	209 98

\$11,804 36

Amount paid out of appropriation for Harvard street

\$6,000 00

Amount paid out of appropriation for street improvements, Aldermanic District No. 12

4,271 36

Amount paid out of appropriation for Paving Division

1,533 00

\$11,804 36

Houghton street, Ward 24, Mill street to Pope's Hill.

Grading; 3,618 sq. yds. 4-inch Telford macadam.

Labor	\$3,155 71
Teaming	1,234 80
Gravel	754 05
Steam-roller	150 00
585 tons macadam	877 50
Work done by Sewer Division	378 34

\$6,550 40

Amount of appropriation for Houghton street

\$6,550 40

Howell street, Ward 15, Dorchester avenue to Boston street.

Length, 602 feet; 1,739 sq. yds. 12-in. Telford macadam. Setting edgestones, gravelling sidewalks, and paving gutters.

Labor	\$1,573 93
Teaming	250 50
Roller	150 00
Gravel	570 75
702 tons of macadam	1,053 00
1,150 feet of edgestone	865 50
23 feet of circular edgestone	29 90
Lumber	57 84
Sundries	41 50
Paid for building wall	230 00
5,347 cu. yds. filling, at 30 cts.	\$1,604 10
71.5 " retaining-wall, at \$4	286 00

Carried forward,

\$1,890 10

\$4,822 92

<i>Brought forward,</i>	\$1,890 10	\$4,822 92
50 lin. feet of capping, at \$1.75 . . .	87 50	
Excavation	25 00	
1,164 feet of edgestone set, at 8 cts. . .	93 12	
446.2 sq. yds. block paving, at 25 cts. .	111 55	
27 sq. yds. round paving, at 25 cts. . .	6 75	
28 " brick " " 18 " . . .	5 04	
	<hr/>	2,219 06
		<hr/>
Amount of appropriation for Howell street,	\$2,880 61	\$7,041 98
Amount paid out of street improvements, Aldermanic District No. 7	4,161 37	
	<hr/>	<u>\$7,041 98</u>

Humboldt Avenue, Ward 21.

Grade damages	<u>\$225 52</u>
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Hunneman street, Ward 20, grading.

Grade damages	\$100 00
Labor	380 45
Teaming	126 00
Gravel	357 00
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	<u>\$963 45</u>

Jackson street, Ward 15, grading.

Labor	\$414 50
2,171 cu. yds. filling	1,085 50
	<hr/>
Amount of appropriation for Jackson street	<u>\$1,500 00</u>

La Grange street, Ward 23, grading.

Labor	\$2,928 05
Teaming	1,644 00
Powder, fuel, etc.	302 46
678 cu. yds. rock removed, at \$1.75 . . .	\$1,186 50
461 double loads filling, at 75 cts. . . .	345 75
	<hr/>
	<u>\$6,406 76</u>

Amount paid out of appropriation for La Grange street	\$3,269 30
Amount paid out of appropriation for street improvements, Aldermanic District No. 11	1,532 25
Amount paid out of appropriation for Paving Division	1,605 21
	<hr/>
	<u>\$6,406 76</u>

Landing, East Boston.

Building landing as per contract	\$250 00
Rent	250 00
	<hr/>
Amount of appropriation for landing, East Boston	<u>\$500 00</u>

Lehigh street, Wards 12 and 16, Albany to South street.

Resetting edgestone, relaying sidewalks; 2,890 sq. yds. granite block paving.

Labor	\$4,431 47
Teaming	1,578 00
Gravel	529 30
65,185 large granite blocks	4,791 10
Work done by Sewer Division	449 11
	<hr/>
	\$11,778 98

Amount of appropriation for Lehigh street,	\$2,831 78	
Amount paid out of Street Improvements,		
Ward 12	6,283 73	
Amount paid out of Street Improvements,		
Aldermanic District No. 6	2,198 17	
Amount paid out of Street Improvements,		
Aldermanic District No. 5	465 30	
	<hr/>	\$11,778 98

Lexington avenue, Ward 25, Washington to Union street.

Length, 736 ft.; grading, gravelling sidewalks 2,126 sq. yds. 6-in. macadam.

Labor	\$420 00
Teaming, including rolling	462 00
400 tons of macadam	600 00
Gravel	653 30
	<hr/>
	\$2,135 30

Amount of appropriation for Lexington ave.,	\$1,702 90	
Amount paid out of Paving Division	432 40	
	<hr/>	\$2,135 30

Ninth street, Ward 14, Old Harbor to N street.

Resurfacing 9,200 sq. yds. 6-in. macadam.

Labor	\$1,060 17
Teaming, including rolling	1,404 00
2,314 tons of macadam	3,471 00
Gravel	439 50
	<hr/>
	\$6,374 67

Amount of appropriation for Ninth street	\$5,827 14	
Amount paid out of Street Improvements,		
Aldermanic District No. 7	547 53	
	<hr/>	\$6,374 67

Norfolk street, Ward 24, Milton to Corbett street.

Length, 1,840 ft.; widening and grading, gravelling sidewalks, 7,006 sq. yds. 12-in. macadam.

Labor	\$2,223 18
Teaming	717 50
Gravel	706 18
Roller	100 00
2,934 tons of macadam	4,406 00
	<hr/>
	\$8,152 86

Amount of appropriation for Norfolk street,	\$2,350 00	
Amount paid out of Street Improvements,		
Aldermanic District No. 12	5,802 86	
	<hr/>	\$8,152 86

Park street, Charlestown, widening and repaving.

Labor	\$310 50
Teaming	85 50
Gravel	196 02
Blocks	222 94
Brick	91 00
Paving	262 06
	<hr/>
	\$1,168 02

Parmenter street, Ward 6, Salem to Hanover street.

Labor	\$375 35
Teaming	285 00
Paid to Metropolitan Construction Co.:	
134 $\frac{6}{10}$ cu. yds. concrete base, at \$5	673 00
Paid to Barber Asphalt Paving Co.:	
764 sq. yds. asphalt laid, at \$2.25	1,719 00
	<hr/>
	\$3,052 35

Amount of appropriation for Parmenter st.	\$1,500 00
Amount paid out of Street Improvements, Aldermanic District No. 3	1,552 35
	<hr/>
	\$3,052 35

River street, Ward 24, Washington street to Blue Hill avenue.

Length, 7,149 ft.; resurfacing and reconstructing 21,000 sq. yds. 15-in. Telford macadam.

Labor	\$4,045 97
Teaming	697 50
2,702 tons of macadam	4,053 00
419 double loads gravel	691 35
Steam-roller	890 00
	<hr/>
	\$10,377 82

Amount of appropriation for River street	\$4,000 00
Amount paid out of Street Improvements, Aldermanic District No. 12	6,377 82
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	\$10,377 82

Savin Hill avenue, Ward 24, resurfacing street at railroad bridge.

Labor and material	\$810 40
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Sawyer avenue, Ward 24, Cushing avenue to Pleasant street.

Length, 2,021 ft.; 5,833 sq. yds. 4-in. macadam.

Labor	\$783 18
Teaming	296 00
Steam-roller	150 00
Gravel	300 30
680 tons of macadam	1,020 00
Work done by Sewer Division	163 96
	<hr/>

Amount of appropriation for Sawyer avenue	\$2,713 44
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Short street, Ward 23, grading, earth excavation.

Labor	\$1,421 23
Teaming	514 50
	<hr/>
	\$1,935 73

Amount of appropriation for Short street	\$1,806 73
Amount paid out for Paving Division	129 00
	<hr/>
	\$1,935 73

Smith street, construction, Ward 22.

Labor	\$942 20
Teaming	366 00
Roller	200 00
Gravel and sand	159 90
128 tons of macadam	224 00
Work done by the Sewer Division	116 00

Amount of appropriation for Smith street \$2,008 10

So. Margin street, Pitts to Prospect street, resetting edgestones, relaying sidewalks, 1,147 sq. yds. granite block paving.

Labor	\$1,075 80
Teaming	597 00
Gravel	167 50
Excavating	246 48
26,385 large granite blocks	1,939 30
280 feet of edgestone	210 00
Work done by Sewer Division	263 92

Amount of appropriation for So. Margin street \$4,500 00

Stanton street, Ward 24, Norfolk to Evans street.

Length, 1,100 ft.; 3,300 sq. yds. 4-in. macadam.

Labor	\$1,222 47
Teaming	409 50
Roller	200 00
Stone	796 53
Gravel	148 50

\$2,777 00

Amount of appropriation for Stanton street, \$2,000 00

Amount paid out of Paving Division 777 00

\$2,777 00

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 1.**Bennington street, Marion to Chelsea street, and across Chelsea street, paving and regulating.**

Length, 2,291 ft.; area, 6,456 sq. yds.

Labor, including engineering and inspection	\$4,818 89
Teaming	1,231 50
Gravel	1,711 27
Sand	501 00
Lumber	154 36
Advertising	34 80
149,420 large granite blocks	10,982 37
45,000 paving brick	585 00
388 ft. flagging	341 44

Paid to Doherty & O'Leary, for paving:

6,456.5 sq. yds. block paving, at 25 cts.	\$1,614 13
2,419.5 lin. ft edgestone set, at 8 cts.	193 56
2,951 sq. yds. brick paving, at 18 cts.	531 18
24 sq. yds. brick paving, h. b., at 36 cts.	8 64

Carried forward,

\$2,347 51

\$20,360 63

<i>Brought forward,</i>	\$2,347 51	\$20,360 63
165.5 sq. yds. flag crosswalks, at 25 cts.	41 38	
35 days' labor, at \$2.00	70 00	
	<hr/>	2,458 89
		<hr/>
		<u>\$22,819 52</u>

Border street, White street to Condor street.

Amount retained from H. Gore & Co. on their contract in 1892	<u>\$410 67</u>
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Condor street, Border street to Meridian street, paving and regulating. Length, 271 ft.

Area, 1,080 sq. yds.		
Labor, including engineering and inspection	\$510 85	
Teaming	178 50	
Gravel	315 43	
218.5 feet of edgestone	163 88	
22,584 large granite blocks	1,659 92	
Paid to Doherty & O'Leary, for paving:		
1,024 sq. yds. block paving, at 25 cts.	\$256 00	
298.2 feet of edgestone set, at 8 cts.	23 86	
56 sq. yds. flagging crossings, at 25 cts.	14 00	
	<hr/>	293 86
		<hr/>
		<u>\$3,122 44</u>

Maverick street, Border street to New street, paving and regulating, including excavation and sub-grading.

Length, 189 ft.; area, 651 sq. yds.		
Labor, including engineering and inspection	\$1,217 83	
Teaming	75 00	
Gravel	219 22	
Sand	44 00	
17,035 large granite blocks	1,252 07	
13,000 paving brick	169 00	
Paid to Doherty & O'Leary, for paving:		
638 sq. yds. block paving, at 25 cts.	\$159 50	
379 feet of edgestone set, at 8 cts.	30 32	
354 sq. yds. brick paving, at 18 cts.	63 72	
13 sq. yds. flagging crossings, at 25 cts.	3 25	
	<hr/>	256 79
		<hr/>
		<u>\$3,233 91</u>

New street, Cross street to Maverick street. Length, 281 ft.; 851 sq. yds. granite block paving, 291 sq. yds. cobble-stone paving.

Area, 1,142 sq. yds.		
Labor, including inspection and engineering	\$503 69	
Teaming	142 50	
Gravel	231 25	
Sand	34 00	
170.5 feet edgestone, and 1 large corner	133 38	
17,213 large paving blocks	1,265 16	
13,000 paving brick	169 00	
	<hr/>	
<i>Carried forward,</i>		\$2,478 98

<i>Brought forward,</i>	\$2,478 98
Paid to Doherty & O'Leary, for paving:	
1,082 sq. yds. block paving, at 25 cts. . . .	\$270 50
548 feet of edgestone set, at 8 cts. . . .	43 84
349 sq. yds. brick paving, at 18 cts. . . .	62 82
60 sq. yds. flagging crossings, at 25 cts. . . .	15 00
	<hr/>
	392 16
	<hr/>
	\$2,871 14
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Work done by Sewer Division	\$1,542 32
	<hr/>

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 2.

Mystic avenue, Main street to Somerville line. Length, 280 ft.; area, 1,616 sq. yds.

Labor, including engineering and inspection	\$1,149 47
Teaming	249 00
Gravel	374 22
31,236 large granite blocks	2,280 23
3,200 paving brick	41 60
Paid to P. Brennan, for paving:	
1,616 sq. yds. block paving, at 25 cts. . . .	\$404 00
215 sq. yds. brick paving, at 18 cts. . . .	38 70
10 sq. yds. flagging crossings, at 25 cts. . . .	2 50
440.5 feet of edgestone set, at 8 cts. . . .	35 24
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	480 44
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	\$4,574 96
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Rutherford avenue, Allen to Cambridge street. Length, 1,029 ft.; area, 4,725 sq. yds.

Labor, including engineering and inspection	\$2,841 38
Teaming	700 50
Gravel	1,081 08
Advertising	11 40
Sundries	12 00
114,020 large granite blocks	8,323 46
Paid to John Turner & Co., for paving:	
12 $\frac{1}{2}$ feet of edgestone, at 70 cts. . . .	\$8 46
25 feet of circular stone, at \$1.30	32 50
201 feet edgestone set, at 8 cts. . . .	16 08
4,725.4 sq. yds. block paving laid, at 25 cts. . . .	1,181 35
54.5 sq. yds. brick sidewalks laid, at 18 cts., . . .	9 81
1 large corner	5 40
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	1,253 60
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	\$14,223 42
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South Eden street, Main street to Rutherford avenue. Length, 513 ft.; area, 1,671 sq. yds.

Labor, including engineering and inspection	\$758 80
Teaming	141 00
Gravel	433 62
Sundries	24 50
	<hr/>
<i>Carried forward,</i>	\$1,357 92

<i>Brought forward,</i>	\$1,357 92
15,000 paving brick	195 00
35,992 large granite blocks	2,627 41
Paid to John Turner & Co., for paving:	
9.5 feet of edgestone, at 70 cts.	\$6 65
1,121 feet of edgestone set, at 8 cts.	89 68
1,625 sq. yds. block paving laid, at 25 cts.	406 25
46 sq. yds. flagging crossings, at 25 cts.	11 50
626 sq. yds. brick paving, at 18 cts.	112 68
1 small corner	3 60
	<hr/>
	630 36
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	\$4,810 69
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Work done by the Sewer Division	\$705 18
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STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 3.

Exchange Street, State street to Dock square. Granite block paving on concrete with pitch joints.

Length, 335 ft.; area, 569.5 sq. yds.	
Labor, including engineering and inspection	\$815 30
Teaming	502 50
Beach gravel	46 90
13,798 large granite blocks	1,018 93
3,011 paving brick	39 14
115 feet of edgestone	86 25
Advertising	50 00
Paid to J. J. Sullivan:	
553 sq. yds. block removed, at 24 cts.	132 72
Paid to Metropolitan Construction Co.:	
97.4 cu. yds. cement concrete base, at \$5	487 00
Paid to F. H. Cowin & Co., for paving:	
569.5 sq. yds. block paving, tar joints, at 79 cts.	\$449 91
19 sq. yds. flagging laid, at 79 cts.	15 01
138 sq. yds. brick paving laid, at 18 cts.	24 84
50 sq. yds. block paving laid, at 25 cts.	12 50
11 sq. yds. flagging laid, at 25 cts.	2 75
	<hr/>
	505 01
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	\$3,683 75
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Fulton Place, North to Fulton street.

Length, 306 ft.; area, 820 sq. yds.	
Labor, including engineering and inspection	\$746 95
Teaming	654 00
Beach gravel	134 00
Advertising	9 60
17,500 large paving blocks	1,286 25
6,000 paving bricks	78 00
Paid to James Grant & Co., for paving:	
810 sq. yds. block paving laid, at 25 cts.	\$202 50
678 feet of edgestone set, at 8 cts.	54 24
289 sq. yds. brick paving laid, at 18 cts.	52 02
10.3 sq. yds. flagging crossing laid, at 25 cts.	2 58
13 sq. yds. flagging sidewalks laid, at 25 cts.	3 25
	<hr/>
	314 59
	<hr/>
	\$3,223 39
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Market Street, Portland to Merrimac street, and portion of Portland street.

Area, 260 sq. yds.

Labor, including inspection and engineering	\$265 45
Teaming	151 00
Beach gravel	76 80
6,000 large granite blocks	441 00

Paid to H. Gore & Co., for paving:

199 sq. yds. block paving, at 25 cts.	\$49 75
108 feet of edgestone set, at 8 cts.	8 64
80 sq. yds. brick sidewalks laid, at 18 cts.	14 40
28.5 sq. yds. flagging crossings laid, at 25 cts.	7 13
	<hr/>
	79 82

\$1,014 17

Work done by the Sewer Division \$410 36

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 4.**Arch street, Milk to Franklin street. Length, 426 ft.**

Area, 1,206 sq. yds.

Labor, including engineering and inspection	\$193 50
Teaming	186 00
Gravel	8 88
Flagging	59 40

Paid to Barber Asphalt Paving Co., 1,206 sq. yds. asphalt laid, at \$2.25	2,713 50
	<hr/>
	\$3,161 28

Amount paid out of appropriation for Street Improvements, Aldermanic District No. 4,	\$1,713 50
Amount paid out of appropriation for Paving Division	1,447 78
	<hr/>

\$3,161 28**Beacon street, Tremont to Bowdoin street. Length, 630 ft.**

Area, 1,751 sq. yds. Granite blocks on a gravel base with pitch joints.

Labor, including engineering and inspection	\$461 43
Teaming	1,014 00
Gravel	201 30
Sand	168 00
37,076 large granite blocks	2,725 09

Paid to F. H. Cowin & Co., for paving:

210.5 feet of edgestone set, at 8 cts.	\$16 84
564 sq. yds. block laid, tar joints, at 70 cts.	394 80
27 sq. yds. block laid, tar joints, at 90 cts.	24 30
1,048 sq. yds. block laid, tar joints, at 79 cts.	827 92
59 sq. yds. flagging crosswalks, tar joints, at 79 cts.	46 61
53 sq. yds. block paving laid, at 25 cts.	13 25
186½ sq. yds. brick paving laid, at 18 cts.	33 57
74½ hours' labor	21 37
	<hr/>
	1,378 66

\$5,948 48

Spring lane, Washington to Devonshire street.

Length, 215 ft.; area, 391 sq. yds.

Labor, including engineering and inspection	\$511 05
Teaming	207 00
Lumber	4 18
10,000 asphalt blocks	400 00
Paid to Metropolitan Construction Co.:	
43.5 cu. yds. concrete base, at \$7.50	326 25
Paid to John Turner & Co.:	
Labor	\$434 70
Material	82 97
	<hr/>
	517 67
	<hr/>
	\$1,966 15
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Work done by Sewer Division \$334 44

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 5.**Beacon Street, Gloucester street to West Chester park.**

Length, 1,019 ft.; area, 5,391 sq. yds. asphalt, and 204.5 sq. yds. block paving on gravel with pitch joints, edgestones reset, and sidewalk repaved.

Labor, including engineer and inspection	\$3,175 42
Teaming	1,434 00
Sand	95 40
Sundries	59 27
Paid to Metropolitan Construction Co.:	
898.5 cu. yds. concrete base, at \$5	4,492.50
Paid to Barber Asphalt Paving Co.:	
5,391.3 sq. yds. asphalt laid, at \$2.25	12,130 42
Paid to F. H. Cowin & Co.:	
204.5 sq. yds. block paving, tar joints, at 79	
cts.	\$161 56
1,487 feet of edgestone set, at 8 cts.	118 96
1,641 sq. yds. brick paving, at 18 cts.	295 38
90 sq. yds. brick paving, h. b., at 36 cts.	32 40
113 sq. yds. brick paving, h. b., on edge, at	
50 cts.	56 50
154 sq. yds. brick paving on edge, at 36 cts.	55 44
67 sq. yds. flagging crosswalks, at 25 cts.	16 75
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	736 99
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	\$22,124 00
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Carver street, Eliot to Pleasant street.

Length, 724 ft.; area, 1,851 sq. yds. Granite block paving on gravel base, edgestones reset and sidewalks relaid.

Labor, including engineering and inspection	\$1,376 88
Teaming	1,387 50
Beach gravel	338 35
Sand	63 00
38,165 large granite blocks	2,805 13
18,000 paving brick	234 00
115 feet of edgestone	86 25
	<hr/>

Carried forward,\$6,291 11

Brought forward,

\$6,291 11

Paid to F. H. Cowin & Co., for paving:

1,851 sq. yds. block paving, at 25 cts.	\$462 75
1,424 feet of edgestone set, at 8 cts.	113 92
840 sq. yds. brick paving, at 18 cts.	151 20
43.75 sq. yds. flagging crossings, at 25 cts.	10 94

738 81

\$7,029 92**Dwight street, Shawmut avenue to Tremont street.**

Length, 716 ft.; area, 2,075 sq. yds.

Labor, including engineering and inspection	\$958 33
Teaming	870 00
Lumber	23 30
Sundries	71 00

Paid to Metropolitan Construction Co.:

345.8 cu. yds. cement concrete base, at \$5	1,729 00
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Paid to H. Gore & Co.

2,075 sq. yds. Sicilian rock asphalt, at \$2.25	4,668 75
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\$8,320 38**West Chester park, Haviland to Newbury street.**

Length, 470 ft.; area, 1,600 sq. yds. 8-in. macadam. Edgestones re-set, sidewalks and crossings relaid.

Labor, including engineering and inspection	\$1,485 77
Teaming	472 50
Gravel	441 60
Sand	196 00
Stone	1,095 90

Paid to J. Doherty & Co.:

526 sq. yds. brick paving, at 25 cts.	\$131 50
879 ft. of edgestone set, at 8 cts.	70 32
877 sq. yds. brick paving, at 18 cts.	157 86
122 sq. yds. flagging crossings, at 25 cts.	30 50

390 18

\$4,081 95**Work done by Sewer Division** \$619 33**Work done by Bridge Division** \$1,286 60

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 6.

Broadway, from Gardner place, 150 ft. easterly.

Paid to H. Gore & Co.:

647 8 sq. yds. Sicilian rock asphalt, at \$3.75	\$2,429 25
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Extra work:

11.7 sq. yds. block paving and concrete foundations, at \$3.75	\$43 88
10 sq. yds. block paving, at 40 cts.	4 00
304 lin. ft. edgestone set, at 18 cts.	54 72
419 sq. yds. brick paving, at 28 cts.	117 32
Teaming	73 00
Mason-work	18 15

311 07

Labor	80 50
10,800 paving brick	140 40

\$2,961 22

Cove street, Kneeland to East street.

Length, 589 ft.; area, 1,590 sq. yds. Edgestones reset and sidewalks relaid.

Labor, including engineering and inspection	\$1,851 15
Teaming	748 50
Beach gravel	117 92
31,770 large granite blocks	2,335 10
256 ft. of edgestone	192 00
Paid to J. J. Sullivan:	
1,424 sq. yds. cobble removed, at 24 cts.	341 76
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	\$5,586 43

Eliot street.

Amount retained from C. B. Payson & Co. for work done in 1892

\$552 17

Work done by the Sewer Division

\$1,229 53

Work done by the Bridge Division

\$2,517 53

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 7.**E. Eighth street, Old Harbor to G street.**

Length, 916 ft.; area, 1,500 sq. yds. Edgestone reset and sidewalks gravelled.

Labor, including inspection and engineering	\$1,058 00
Teaming	399 00
Gravel	234 50
Wharfage	101 13
Advertising	6 00
31,530 large granite blocks	2,317 46
2,000 paving brick	26 00
Paid to H. Gore & Co., for paving:	
1,494.2 sq. yds. block paving, at 25 cts.	\$373 55
855.8 feet of edgestone reset, at 8 cts.	68 46
242.6 sq. yds. brick paving, at 18 cts.	43 67
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	485 68

\$4,627 77

E. Sixth street, K to L street.

Length, 519 ft.; area, 1,399 sq. yds.

Labor, including engineering and inspection	\$991 72
Teaming	432 00
Gravel	75 60
Wharfage	77 37
30,884 large granite blocks	2,269 97
5,600 paving brick	72 80
Paid to H. Gore & Co., for paving:	
1,389 sq. yds. block paving laid, at 25 cts.	\$347 25
1,007.6 feet of edgestone reset, at 8 cts.	80 61
779 sq. yds. brick paving, at 18 cts.	140 22
10 sq. yds. flagging crossings, at 25 cts.	2 50
	<hr/>
	570 58

\$4,490 04

I street, Fourth to Sixth street.

Length, 560 ft.; area, 1,742 sq. yds. Resurfacing.

Labor	\$250 70
Teaming	45 00
Macadamizing	850 81
Gravel and blocks	231 70

\$1,378 21

Amount paid out of the appropriation for Street Improvements, Aldermanic District No. 7 . . . \$250 70

Amount paid out of the appropriation for Paving Division 1,127 51

\$1,378 21
Third street, E to Dorchester street, and I to L street.

Length, 2,478 ft.; area, 7,710 sq. yds. Resurfacing.

Labor	\$630 28
Teaming, including roller	457 50
Gravel and stone	1,962 18

\$3,049 96

Work done by the Sewer Division \$1,073 87

Work done by the Bridge Division \$1,292 94

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 8.

Randolph street, Harrison avenue to Albany street.

Length, 807 ft.; area, 2,331 sq. yds.

Labor	\$1,258 10
Gravel	819 11
55,033 large granite blocks	4,044 93

\$6,122 14
Savoy street, Washington street to Harrison avenue.

Length, 320 ft.; area, 602 sq. yds. Paving roadway, setting edge-stones, and laying sidewalks.

Labor	\$949 10
Teaming	502 50
Beach gravel	54 27
Advertising	6 30
22,480 small granite blocks	1,079 04
275 feet of edgestone	213 75

\$2,804 96

Work done by the Sewer Division \$536 11

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 9.

Tremont street, Huntington avenue to Heath street.

Length, 2,121 ft.; area, 4,428 sq. yds. Resurfacing.

Labor	\$419 00
Teaming, including rolling	690 00

Carried forward,

\$1,109 00

<i>Brought forward,</i>	\$1,109 00
Gravel	712 30
Stone	1,977 89
	<u>\$3,799 19</u>

Work done by the Sewer Division \$383 32

Work done by the Bridge Division \$4,914 26

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 10.

Centre street, Eliot square to New Heath street.

Length, 2,000 ft.; area, 6,123 sq. yds. 8-inch macadam. Edgestones
reset, sidewalks relaid, gutters relaid, and crossings laid.

Labor	\$1,196 08
Teaming, including rolling	2,125 50
Gravel	1,783 65
Sand	2,035 09
Stone	2,840 00
99.5 feet of circular edgestone	129 35
1,482 feet of edgestone and 2 small corners	1,118 20
56,800 paving brick	436 75
18,900 gutter blocks	378 00
Advertising	22 50

Paid to Wm. McEleney, for paving:

3,051 feet of edgestone reset, at 8 cts.	\$244 08
1,795 sq. yds. block paving, at 25 cts.	448 75
1,382 sq. yds. brick paving, at 18 cts.	248 76
120 sq. yds. brick paving, h. b., at 36 cts.	43 20

984 79

\$13,049 91

Dean avenue.

Filling \$767 50

Kemble street, Gerard street, westerly, 318 feet.

Length, 318 ft.; area, 1,143 sq. yds.

Labor, including engineering and inspection	\$572 23
Teaming	447 00
Gravel	712 80
Filling	332 50
21,150 large granite blocks	1,554 53
576 feet of edgestone	432 00

Paid to Doherty & O'Leary, for paving:

1,143.4 sq. yds. block paving, at 25 cts.	\$285 85
636 feet edgestone reset, at 8 cts.	50 88
73.4 sq. yds. crossings laid, at 25 cts.	18 35

355 08

\$4,406 14

Work done by the Sewer Division \$776 45

STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 11.

Concrete Sidewalks.

Paid to Simpson Bros.:

2,032.5 sq. yds. concrete laid, W. Roxbury	\$1,860 92
1,966.8 sq. yds. concrete laid, Brighton	1,918 66
	<hr/>
	\$3,779 58

Henshaw street, Market to Cambridge street.

Length, 799 ft.; area, 2,940 sq. yds. 8-in. macadam. Grading, edge-stones set, gutters paved, crosswalks laid, and sidewalks gravelled.

Labor	\$2,400 55
Teaming, including rolling	1,230 00
Gravel	1,653 05
Stone	1,569 50
Advertising	15 75
24,000 gutter blocks	480 00
1,532 $\frac{8}{12}$ feet of edgestone, }	1,181 90
1 large and 8 small corners, }	
158 $\frac{2}{12}$ feet of circular edgestone	176 24
	<hr/>
	\$8,302 99

Peter Parley street, Forest Hills street to Walnut avenue.

Length, 1,132 ft.; area, 3,271 sq. yds. 12-inch. Telford macadam. Grading, edgestones set, gutters paved, sidewalks gravelled, and crossings laid.

Labor	\$1,702 95
Teaming, including rolling	1,450 00
Gravel	1,272 00
Stone	3,080 25
25,000 gutter blocks	797 55
2,200 ft. edgestone and 4 small corners	1,663 40
208 $\frac{2}{12}$ ft. circular edgestone	208 17
Paid to T. H. & S. D. Payson, for paving:	
2,706.5 ft. of edgestone reset, at 8 cts.	\$216 52
959.4 sq. yds. block paving, at 25 cts.	239 85
	456 37

\$10,630 69**Washington street, Poplar to Albano street.**

Resurfacing, edgestone set, sidewalks gravelled, and gutters paved. Retaining-wall built.

Labor	\$622 03
Teaming	868 50
Gravel	752 76
Stone	845 50
Sundries	112 50
30,950 small granite blocks	690 05
Paid to James Doonan:	
137.3 perches mortar wall	664 38
Paid to T. H. & S. D. Payson:	
1,736.3 feet of edgestone reset, at 8 cts.	\$138 90
793 sq. yds. block paving, at 25 cts.	198 26
414 sq. yds. brick paving, at 18 cts.	74 52

411 68*Carried forward,*

\$4,967 40

<i>Brought forward,</i>		\$4,967 40
Amount paid out of appropriation for Street Improvements, Aldermanic District No. 11	\$1,871 03	
Amount paid out of appropriation for Paving Division	3,096 37	
		<u>\$4,967 40</u>

Wirt street, Washington to Henshaw street.

Length, 287 ft.; area, 829 sq. yds. Grading, edgestone reset, sidewalks gravelled, and gutters paved.	
Labor	\$713 70
Teaming, including rolling	402 00
Gravel	687 40
Stone	1,211 00
34.5 feet circular edgestone	44 85
	<u>\$3,058 95</u>

Work done by the Sewer Division	<u>\$5,557 47</u>
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STREET IMPROVEMENTS, ALDERMANIC DISTRICT NO. 12.

Beale street, Dorchester avenue to N.Y., N.H., & H. R.R.

Length, 535 ft.; area, 1,493 sq. yds. 6-inch macadam. Sidewalks gravelled.	
Labor	\$343 25
Teaming, including rolling	134 50
Gravel	158 40
Stone	652 75
Advertising	14 25
	<u>\$1,303 15</u>

Dorchester avenue.

Grade damages	<u>\$3,355 00</u>
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Glen road.

Labor and material	<u>\$507 40</u>
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Park street, Washington to Whitfield street. Grading, setting edgestone, and paving gutters.

Labor	\$880 90
Teaming	640 50
Gravel	488 40
Stone	50 08
Advertising	7 20

Paid to Chas. J. Coates, for paving:

1,919.6 feet of edgestone reset, at 8 cts.	\$153 57
700 sq. yds. block paving, at 25 cts.	175 00
	<u>328 57</u>
	<u>\$2,395 65</u>

Sydney street, Savin Hill avenue to Hartland street, grading, edgestone set, sidewalks laid, gutters paved, and crossings laid.

Length, 1,255 ft.; area, 3,626 sq. yds. 8-in. macadam.	
Labor	\$783 15
Teaming, including rolling	544 00

Carried forward,\$1,327 15

<i>Brought forward,</i>	\$1,327 15
Gravel	407 55
Sand	358 20
Stone	1,429 57
Advertising	7 80
970 feet of edgestone	727 92
8,250 paving brick	99 00
36,067 gutter blocks	792 42

Paid to Chas. J. Coates :	
2,555 feet of edgestone reset, at 8 cts.	\$204 40
898.1 sq. yds. block paving, at 25 cts.	224 53
1,780.6 sq. yds. brick paving, at 18 cts.	320 51
	<hr/>
	749 44
	<hr/>
	\$5,899 05

Work done by the Sewer Division \$908 81

Vale Street, Ward 15. Grading.

Labor	\$269 78
1,105 double loads of filling, at 50 cts.	552 50
891 single loads of filling, at 25 cts.	222 75
	<hr/>
	\$1,045 03

Amount of appropriation for Vale street	\$1,000 00
Amount paid out of Paving Division	45 03
	<hr/>
	\$1,045 03

West Newton street, Ward 18, Shawmut avenue to Washington street.

Amount retained from Metropolitan Construction Company on their contract in 1892	
	\$172 98
Amount of appropriation for West Newton street	\$161 26
Amount paid out of Paving Division	11 72
	<hr/>
	\$172 98

West Third street, Ward 13, A street to 150 ft. from E street.

Length, 1,984 ft.; area, 7,173 sq. yds. 9-in. macadam.	
Labor	\$441 27
Advertising	16 50
Steam-roller	200 00
Gravel	625 00
2,011 tons of macadam	3,016 50
	<hr/>
	\$4,299 27

Amount of appropriation for West Third street	\$1,900 00
Amount paid out of Street Improvements, Aldermanic District No. 6	2,399 27
	<hr/>
	\$4,299 27

Whiting street, Ward 21. (Unfinished.)

Paid to J. J. Nawn :	
800 cu. yds. rock excavation, at \$2.00	\$1,600 00

Worthington street, Ward 22, resurfacing.

Labor and material	\$1,000 00
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SUMMARY OF EXPENDITURES UNDER SPECIAL
APPROPRIATIONS.

TOTAL AMOUNT EXPENDED.

Allston bridge	\$2,504 56
Baker street, Ward 23	649 60
Beacon street, Ward 25	108 90
Brent street	4,704 26
Bristol street	3,549 96
Broadway, Harrison avenue to Broadway bridge	7,782 42
Chardon street	409 83
Cherry street	65 10
Commonwealth avenue	266,246 65
Congress and L streets	17,646 50
Cooper street, between No. Margin and Salem streets	1,627 50
Cranston street	1,158 20
Dickens street	2,073 21
Dorchester avenue, paving, Wards 15 and 24	4,499 92
Dorchester street, between Eighth street and Dorchester avenue	496 87
Eighth street, L to O street, edgestones, etc.	2,690 72
Englewood avenue and Sutherland road	8,528 52
Freeport street	10,849 55
Grant street	241 52
Harbor View street	612 96
Harvard street, construction	11,804 36
Houghton street, macadamizing	6,550 40
Howell street, construction	7,041 98
Humboldt avenue extension, grade damages	225 52
Hunneiman street, grading and constructing	963 45
Jackson street, construction	1,500 00
L street, grading, etc. (See Congress and L streets.)	6,406 76
La Grange street	500 00
Landing, East Boston	11,778 98
Lehigh street, paving	2,135 30
Lexington avenue	6,374 67
Ninth street, Old Harbor street to N street, macadamizing, Norfolk street, Milton street to Corbett street	8,152 86
Park street, Charlestown	1,168 02
Parmenter street, construction	3,052 35
River street	10,377 82
Savin Hill avenue	810 40
Sawyer avenue	2,713 44
Short street, Ward 23	1,935 73
Smith street, construction	2,008 10
South Margin street, between Pitts street and Prospect street	4,500 00
Stanton street	2,777 00
Street Improvements, Aldermanic District No. 1 :	
Bennington street	22,819 52
Border street	410 67
Condor street	3,122 44
Maverick street	3,233 91
New street	2,871 14
Sewers	1,542 32
Street Improvements, Aldermanic District No. 2 :	
Mystic avenue	4,574 96
Rutherford avenue	14,223 42

Carried forward,

\$482,022 27

<i>Brought forward,</i>	\$482,022	27
South Eden street	4,810	69
Sewers	705	18
Street Improvements, Aldermanic District No. 3:		
Exchange street	3,683	75
Fulton place	3,223	39
Market street	1,014	17
Sewers	410	36
Street Improvements, Aldermanic District No. 4:		
Arch street	3,161	28
Beacon street	5,948	48
Spring lane	1,966	15
Sewers	334	44
Street Improvements, Aldermanic District No. 5:		
Beacon street	22,124	00
Carver street	7,029	92
Dwight street	8,320	38
West Chester park	4,081	95
Sewers	619	33
Bridges	1,286	60
Street Improvements, Aldermanic District No. 6:		
Broadway	2,961	22
Cove street	5,586	43
Eliot street	552	17
Sewers	1,229	53
Bridges	2,517	53
Street Improvements, Aldermanic District No. 7:		
E. Eighth street	4,627	77
E. Sixth street	4,490	04
I street	1,378	21
Third street	3,049	96
Sewers	1,073	87
Bridges	1,292	94
Street Improvements, Aldermanic District No. 8:		
Randolph street	6,122	14
Savoy street	2,804	96
Sewers	536	11
Street Improvements, Aldermanic District No. 9:		
Tremont street	3,799	19
Sewers	383	32
Bridges	4,914	26
Street Improvements, Aldermanic District No. 10:		
Centre street	13,049	91
Dean avenue	767	50
Kemble street	4,406	14
Sewers	776	45
Street Improvements, Aldermanic District No. 11:		
Concrete sidewalks	3,779	58
Henshaw street	8,302	99
Peter Parley street	10,630	69
Washington street	4,967	40
Wirt street	3,058	95
Sewers	5,557	47
Street Improvements, Aldermanic District No. 12:		
Beale street	1,303	15
Dorchester avenue	3,355	00
Glen road	507	40
Park street	2,395	65

Carried forward,

\$660,920 27

<i>Brought forward,</i>	\$660,920 27
Sydney street	5,899 05
Sewers	908 81
Vale street	1,045 03
West Newton street, Washington street to Shawmut avenue	172 98
West Third street	4,299 27
Whiting street, Ward 21	1,600 00
Worthington street	1,000 00
Laying out and Construction of Highways:	
Batavia street	9,063 73
Bay State road	10,634 20
Deerfield street	3,098 18
Miner street	7,021 19
Sidewalk construction	21,771 74
Total	\$727,434 45
Less amount paid out of appropriation for Paving Division .	19,632 96
Total	<u>\$707,801 49</u>

LAYING OUT AND CONSTRUCTION OF HIGHWAYS.

Under Chap. 323 of the Acts of 1891 as amended in 1892.

Batavia street, St. Stephen to Parker street.

Labor, including engineering and inspection	\$361 20
Advertising	98 94
Filling	794 20

Paid to James Grant & Co.:

411 cu. yds. subgrading, at 25 cts.	\$102 75
1,107 sq. yds. Telford base, at 65 cts.	719 55
2,042 sq. yards macadam, at 45 cts.	918 00
664.7 sq. yds. gutters paved, at \$2.40	1,595 28
1,015.3 feet of edgestone, at 84 cts.	852 85
849.7 sq. yds. brick sidewalks, at \$1.05	892 19
31.3 sq. yds. flagging crossings, at \$4.95	154 94
6 catch-basins, at \$100	600 00
691 cu. yds. gravel filling, at \$1.35	932 85
1,076.5 feet of old edgestone set, at 19 cts.	204 54
723.9 sq. yds. old brick sidewalks laid, at 65 cts.	470 54

\$7,443 49

Extra work as ordered:

103.9 sq. yds. gutters paved, at 43½ cts.	\$45 20
8.2 sq. yds. flagging crosswalks, at 43½ cts.	3 57

48 77

Relocating catch-basins, raising sewer manholes, raising coal-holes, and building curbs around windows:

15 days' labor, at \$2	\$30 00
3 days, stone-cutter, at \$4.50	13 50
7 days 5.5 hours, mason, at \$6.50,	49 46
15½ days, tender, at \$2.50	38 06
2,900 hard bricks, at \$12 per M.,	34 80
4 barrels cement, at \$1.25	5 00

170 82

Loam grading:

111 cu. yds. loam, at \$1.50	\$166 50
3½ days' labor, at \$2	7 55
Seed	1 48

175 53

Resetting edgestone, gutters, and furnishing chip stone:

14½ days, paver, at \$4.50	\$6 50
9½ days' labor, at \$2	19 78
18 double loads stone chips, at \$2.50	45 00
2 double loads gravel, at \$2	4 00

75 28

47½ linear feet edgestone set and furnished, at \$1.50	71 12
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Macadam on St. Stephen street:

14 double loads crushed stone, at \$6	\$84 00
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Carried forward,

\$84 00

\$7,985 91

\$1,254 34

<i>Brought forward,</i>	\$84 00	\$7,985 91	\$1,254 34
3 double loads stone dust, at \$5.50,	16 50		
4 days 3.5 hours, labor, at \$2 .	8 78		
1½ days' steam-roller, at \$16 .	24 00		
		133 28	
Add 15% on \$674.80		101 22	
			8,220 41
			\$9,474 75
Amount retained from James Grant & Co.			411 02
			\$9,063 73

Bay State road, Raleigh to Sherborn street.
(Work unfinished.)

Labor			\$308 20
Advertising			122 69
Paid to James Killian:			
542 cu. yds. sub-grading, at 35 cts.	\$189 70		
4,591 sq. yds. macadam (unfinished), at 45 cts.		2,065 95	
889 sq. yds. gutters paved, at \$2.60		2,311 40	
2,556 lin. ft. edgestone, at 98 cts.		2,504 88	
2,247 sq. yds. gravel sidewalk (unfinished), at 43 cts.		966 21	
75 sq. yds. flagging crossings, at \$1.20		90 00	
4,614 cu. yds. gravel filling, at 84 cts.	3,875 76		
			12,003 90
			\$12,434 79
Amount retained from James Killian			1,800 59
			\$10,634 20

Deerfield street, Commonwealth avenue to Charles river.
(Work unfinished.)

Labor			\$197 40
Advertising			78 20
Paid to James Killian:			
87 cu. yds. sub-grading, at 35 cts.	\$30 45		
579 sq. yds. macadam (unfinished), at 40 cts.,		231 60	
317 sq. yds. gutters paved, at \$2.60		824 20	
1,037 lin. ft. of edgestone, at 97 cts.		1,005 89	
130 sq. yds. gravel walks (unfinished), at 43 cts.		55 90	
1,396 cu. yds. gravel filling, at 84 cts.	1,172 64		
			3,320 68
			\$3,596 28
Amount retained from James Killian			498 10
			\$3,098 18

Miner street.
(Work unfinished.)

Labor			\$355 77
Advertising			108 74
1,414 cu. yds. filling			1,117 06
			\$1,581 57

Carried forward,

<i>Brought forward,</i>		\$1,581 57
Paid to John Sutherland:		
Building retaining-wall No. 1 . . .	\$875 90	
Building retaining-wall No. 2 . . .	1,298 35	
		2,174 25
Paid to Doherty & O'Leary:		
154 cu. yds. sub-grading, at 30 cts. . .	\$46 20	
933 sq. yds. Telford base, at 80 cts. . .	746 40	
933 sq. yds. macadam (unfinished), at 20 cts. . .	186 60	
254 sq. yds. gutters paved, at \$2.31 . .	586 74	
616 lin. ft. edgestone, at \$1.11 . . .	683 76	
481 sq. yds. brick sidewalk, at \$1.25 . .	601 25	
22 sq. yds. flagging crosswalks, at \$3.95 .	86 90	
425 sq. yds. gravel filling, at \$1.17½ . .	499 38	
		3,437 23
		\$7,193 05
Amount retained from Doherty & O'Leary . . .		171 86
		<u>\$7,021 19</u>

NEW EDGESTONE.

The following tables show the amount of new edgestone set during the year:

CITY PROPER.

Wards 6, 7, 8, 9, 10, 11, 12, 16, 17, and 18. (*Paving Districts Nos. 8, 9, and 10.*)

	Lin. ft.
Cambria and Dalton streets	208
Fairfield street	127
North Hudson street	283
Savoy street	275
St. Botolph street	188
Sundry streets in small quantities	37
	<u>1,118</u>

ROXBURY.

Wards 19, 20, 21, and 22. (*Districts 7, 10, and 11.*)

	Lin. ft.
Alexander street	467
Beacon street	442
Bickford and Centre streets	187
Centre street	1,788
Commonwealth avenue	5,368
Eldora and Sunset streets	226
Gannett street	983
Gaston street	153
Hammett street	118
Howard avenue	209
Howland street	279
Humboldt avenue	461
Intervale street	664
Kemble street	1,337
Kingsbury street	291

Carried forward,

12,973

BRIGHTON.

Ward 25. (District No. 4.)

	Lin. ft.
Alcott street	1,057
Commonwealth avenue	838
Henshaw street	1,034
Sparhawk street	250
Wirt street	802
	<hr/>
	3,981
	<hr/>

RECAPITULATION.

	Lin. ft.
City Proper	1,118
Roxbury	14,979
South Boston	4,375
East Boston	1,969
Dorchester	10,587
West Roxbury	4,795
Brighton	3,981
	<hr/>
	41,804
	<hr/>

NEW BRICK SIDEWALKS.

The following tables show the number of square yards of new brick sidewalks laid during the past year.

CITY PROPER.

Wards 6, 7, 8, 9, 10, 11, 12, 16, 17, and 18. (Paving Districts Nos. 8, 9, and 10.)

	Sq. yds.
Albany and East Newton streets	173
Beacon street	229
Cambria and Dalton streets	110
Fairfield street	119
North Hudson street	133
St. Botolph street	157
Sundry streets in small quantities	43
	<hr/>
	964
	<hr/>

ROXBURY.

Wards 19, 20, 21, and 22. (Districts Nos. 7, 10, and 11.)

	Sq. yds.
Alexander street	342
Bay State road	260
Beacon street	369
Bickford and Centre streets	177
Blue Hill avenue	243
Centre street	614
Dale street	511
Gannett street	685
Howard avenue	155
Howland street	235
Humboldt avenue	371
Intervale street	407
Kingsbury street	231
Leyland street	270
	<hr/>

Carried forward,

4,870

<i>Brought forward,</i>	Sq. yds.
Munroe street	4,870
Walnut avenue and Cobden streets	109
Sundry streets in small quantities	144
	789
	<u>5,912</u>

SOUTH BOSTON.

Wards 13, 14, and 15. (District No. 1.)

	Sq. yds.
Broadway	87
East Fifth street	98
East Third street	270
Story street	75
Sundry streets in small quantities	221
	<u>751</u>

EAST BOSTON.

Wards 1 and 2. (District No. 2.)

	Sq. yds.
Falcon street	1,290
Maverick street	254
Meridian street	271
New street	164
West Eagle and Brooks streets	101
Sundry streets in small quantities	117
	<u>2,197</u>

DORCHESTER.

Ward 24. (District No. 6.)

	Sq. yds.
Columbia street	278
Dorchester avenue	130
Sydney street	1,613
Washington street	275
Sundry streets in small quantities	116
	<u>2,412</u>

WEST ROXBURY.

Ward 23. (Districts 5 and 11.)

	Sq. yds.
Centre street	228
Chestnut avenue	76
Sundry streets in small quantities	46
	<u>350</u>

CHARLESTOWN.

Wards 3, 4, and 5. (District No. 3.)

	Sq. yds.
South Eden street	175

RECAPITULATION.

	Sq. yds.
City Proper	964
Roxbury	5 912
South Boston	751
East Boston	2,197
Dorchester	2,412
West Roxbury	350
Charlestown	175
	<hr/>
	12,761

DRIVEWAYS AND SIDEWALKS.

The following table shows the number of square yards of blockstone driveways and concrete sidewalks laid in the various sections of the city during the year:

	Driveway, sq. yds.	Concrete, sq. yds.
City Proper	10	
East Boston	17	
Roxbury	348	372
West Roxbury	16	
Dorchester	203	589
Brighton	77	842
	<hr/>	<hr/>
	671	1,803

PROPERTY IN CHARGE OF THE DEPUTY SUPERINTENDENT OF PAVING DIVISION.

Buildings and wharf on Albany street, opposite Sharon street. The building is of brick and wood, and covers some 8,000 square feet of land, and is divided into a shed for storage, blacksmith's and carpenter's shops, tool-room, and stable. The total contents of the lot, including wharf and building, are 63,180 square feet.

Fort-hill Wharf, containing 21,054 square feet, placed in charge of the Paving Department May 18, 1874, to be used for the landing and storage of paving-blocks and gravel until such time as said wharf shall be wanted for the extension of Oliver street. A part of said wharf is occupied by a tenant-at-will, at \$500 per annum, part by Sanitary Division.

Lot on Chelsea, Marion, and Paris streets, East Boston, containing 43,550 square feet. Part of this lot used by the Sewer Division.

Ledge lot on Washington street, corner Dimock street, Roxbury, containing 134,671 square feet. Upon this lot are buildings containing a steam-engine and stone-crusher.

Highland-st. Stable lot. Upon this lot is a large brick stable, erected in 1873, and occupied by the Sanitary and Paving Divisions; also a brick building used as a blacksmith's shop, and a shed for the storage of tools, etc.

Ledge lot on Codman street, Dorchester, containing 299,000 square feet, was purchased in 1870. Upon this lot is a shed containing a steam-engine and stone-crusher, also a stable and tool-house.

On the Almshouse lot, Hancock street, Dorchester, there are two stables, also a shed and tool-house.

Ledge lot on Magnolia street and Bird place, Dorchester, containing 81,068 square feet. This lot was purchased by the town of Dorchester in 1867.

Downer-avenue lot, Dorchester, containing 35,300 square feet.

West Roxbury. — On Child street, a lot of land containing 43,024 square feet, upon which are a stable and shed, blacksmith's shop and tool-house.

Gravel Lots. — In the town of Milton, on Brush Hill road, containing 64,523 square feet, hired by the town of Dorchester for nine hundred and ninety-nine years. Morton street, Ward 23, containing about one-third of an acre, purchased by the town of West Roxbury in 1890, used for storage purposes.

Ledge and gravel lot, rear of Union street, containing about 37,000 square feet, purchased by the town of Brighton. This lot is at present leased.

Gravel and stones on lot on Market street, Ward 25, purchased by town of Brighton.

Ledge lot on Chestnut Hill avenue, Brighton, containing about 13 acres, upon which are an office, engine-house, stable, and crusher plant.

On Medford street, Charlestown, a wharf lot, foot of Elm street, containing 8,000 feet, upon which are sheds, office, stable, etc.

Property belonging to the Paving Division, consisting of 94 horses, 66 carts, 19 water-carts, 15 wagons, 6 steam-rollers, 7 stone-crushers, and 7 engines.

In South Boston, corner of H and Ninth streets: stable, carriage-house, shed, tool-house, and office, on leased land.

On Hereford street: a yard with shed, tool-house, and office.

Wharf, known as Atkins' wharf, 521 Commercial street, purchased in 1887 for \$24,000, containing 22,553 square feet, having on it an office and stable.

On Boylston street, at Boylston Station, office and shed.

Respectfully submitted,

C. R. CUTTER,

Deputy Superintendent Paving Division.

APPENDIX C.

REPORT OF DEPUTY SUPERINTENDENT OF THE
SANITARY DIVISION.STREET DEPARTMENT, SANITARY DIVISION,
12 BEACON STREET, BOSTON, February 9, 1894.H. H. CARTER, ESQ., *Superintendent of Streets*:

DEAR SIR: Herewith I send you a statement of the doings of the Sanitary Division during the year 1893, showing the expenditures and income of this division from February 1, 1893, to January 31, 1894.

George W. Forristall, Deputy Superintendent, died January 12, 1894.

PHILIP A. JACKSON,
Acting Deputy Superintendent.

FINANCIAL STATEMENT.

Amount of appropriation	\$470,000 00
Transferred from Paving Division	15,000 00
	<hr/>
	\$485,000 00
Total amount of expenditures	481,300 63
	<hr/>
Balance transferred to city treasury	<u>\$3,699 37</u>

ITEMS OF EXPENDITURES.

	Amount expended.
For salaries of Deputy Superintendent and clerks in office	\$8,511 60
For labor in collecting and removing house-dirt and ashes	152,467 55
For labor in collecting and removing house-offal	102,456 34
For labor of foremen, mechanics, watchmen, and feeders	26,448 74
For labor of men employed in stables and yards	13,451 87
For grain used in stables	24,061 34
	<hr/>
<i>Carried forward,</i>	\$327,397 44

<i>Brought forward,</i>	\$327,397 44
For hay and straw used in stables	16,730 98
For horses	8,625 00
For stock and tools used in blacksmith-shop	3,033 28
For stock and tools used in wheelwright-shop	2,880 31
For stock and tools used in harness-shop	1,499 86
For stock and tools used in paint-shop	666 19
For extra teams, collecting ashes and house-dirt	43,506 50
For extra teams, collecting house-offal	8,780 00
For repairs on stables and sheds	944 77
For fuel, gas, and electric lights	2,021 32
For veterinary services and medicines for horses	548 09
For shoeing horses (outside shops)	662 60
For printing, stationery, and advertising	1,298 66
For water-rates	810 30
For offal stock, consisting of buckets, etc.	353 41
For ash stock, consisting of cart-covers, baskets, etc.,	339 59
For stable stock, consisting of curry-combs, brushes, soap, etc.	937 77
For dumping-boat, rental, royalty, towage, etc.	24,559 08
For collecting house-dirt and ashes in East Boston	10,325 50
For collecting house-dirt and ashes in South Boston, east of Dorchester st.	4,791 60
For collecting house-dirt and ashes in Dorchester, south of Park, School, and Harvard sts.	2,904 19
For collecting house-dirt and ashes in West Roxbury, south of Seaver and Boylston sts.	4,143 75
For collecting house-offal in Brighton	2,800 00
For collecting house-offal in East Boston	8,000 00
For incidental expenses :	
Telephone expenses	\$350 30
Board of horses	506 89
Committee expenses, "Disposal of Offal"	1,525 00
Travelling expenses	166 30
Damage, by city teams	74 19
Inspectors' badges	37 00
Newspapers	6 00
Miscellaneous supplies for office and yards	74 76
	<hr/>
	\$2,740 44
Total	<hr/> <hr/> \$481,300 63

REVENUE.

Amount of moneys deposited and bills presented to the City Collector for collection, for material sold and work performed by the Sanitary Division of the Street Department during the year ending January 31, 1894 :

Moneys deposited with the City Collector.

From sale of house-offal	\$20,790 03	
From sale of a condemned horse	50 00	
From letting of scow privileges	822 01	
	<hr/>	\$21,662 04

Bills deposited with the City Collector.

For the removal of engine ashes	\$5,862 75	
For the sale of manure	906 51	
For the sale of ashes and house-dirt	3,013 97	
For the sale of house-offal	99 00	
For the sale of tin cans	502 05	
For the letting of scow privileges	9 95	
	<hr/>	\$10,394 23
		<hr/>
		\$32,056 27
		<hr/>

Amount collected by the City Collector \$28,969.27

Amount expended for the Collection of House-dirt and Ashes and House-offal, Labor and Contracts.

DISTRICTS.	Expended for collecting.	
	Ashes.	Offal.
City Proper	\$99,869 05	\$56,303 34
South Boston	¹ 7,230 10	7,686 00
East Boston	² 10,325 50	⁵ 8,000 00
Charlestown	11 886 00	5,550 00
Roxbury	24,456 00	14,030 00
West Roxbury	³ 8,137 75	7,444 00
Dorchester	⁴ 10,080 19	11,443 00
Brighton	2,648 00	⁶ 2,800 00
Totals	\$174,632 59	\$113,256 34

Ashes Contract. ¹ F. J. Mohan	\$4,791 60	for territory east of Dorchester street.
“ ² P. Morrison	10,325 50	“ in East Boston.
“ ³ James Doonan	4,143 75	“ south of Seaver and Boylston streets.
“ ⁴ John Bradley	2,904 19	“ south of Park, School, and Harvard streets.
Offal Contract. ⁵ Thomas Mulligan,	8,000 00	“ of East Boston.
“ ⁶ Allen Clarke	2,800 00	“ of Brighton.

Total Cost for Removal of House-dirt, Ashes, and House-offal.

HOUSE-DIRT AND ASHES ACCOUNT.

Expended for labor, per pay-rolls	\$152,467 55	
Expended for stock, etc., per ledger account	124,211 62	
Expended on contract, part of		
South Boston	\$4,791 60	
Carried forward,	<hr/>	<hr/>
	\$4,791 60	\$276,679 17

<i>Brought forward,</i>	\$4,791 60	\$276,679 17	
Expended on contract, part of Dorchester	2,904 19		
Expended on contract, part of West Roxbury	4,143 75		
Expended on contract, East Bos- ton	10,325 50		
	<u>22,165 04</u>		
		<u>22,165 04</u>	\$298,844 21

HOUSE-OFFAL ACCOUNT.

Expended for labor, per pay-rolls	\$102,456 34		
Expended for stock, etc., per ledger account .	57,948 04		
Expended on contract, East Boston, \$8,000 00			
Expended on contract, Brighton	2,800 00		
	<u>10,800 00</u>		
			171,204 38
Salaries	\$8,511 60		
Incidentals	2,740 44		
	<u>11,252 04</u>		
			<u>\$481,300 63</u>

Material collected by Districts.

Material.	TEAMS.						
	YARDS.						Total Loads.
	South.	West	Roxb'y.	Ch'rlestown.	E. Boston.	Brigh'n	
House-dirt and ashes.....	128,930	84,341	70,615	17,898	13,372	5,415	320,571
House-offal	33,829	.....	9,931	2,516	3,744	1,395	51,415
Totals	162,759	84,341	80,546	20,414	17,116	6,810	371,986

Disposition of Material collected.

WHERE DUMPED.	Loads house-dirt and ashes.	Loads house- offal.	Street-sweep- ings, Street- Cleaning Div.	Total loads.
First street, East Cambridge....	27,990	.....	.....	27,990
Swett street, Boston	20,955	.....	.....	20,955
Swett street, Boston	15,259	.....	.....	15,259
East Boston.....	18,163	.....	.....	18,163
Huntington avenue	15,164	.....	.....	15,164
Bartlett court	14,073	.....	.....	14,073
Mill Pond, Charlestown.....	12,059	.....	.....	12,059
East Ninth street, South Boston.	10,544	.....	.....	10,544
Commonwealth flats, So. Boston.	9,218	.....	.....	9,218
Brookside avenue, Roxbury	8,464	.....	.....	8,464
Howard avenue, Roxbury	8,110	.....	.....	8,110
Centre street, Roxbury.....	6,012	.....	.....	6,012
H street, South Boston.....	5,945	.....	.....	5,945
Huntington avenue	5,806	.....	.....	5,806
Roland street, Charlestown.....	5,420	.....	.....	5,420
Bryant street, Roxbury....	4,340	.....	.....	4,340
Various places.....	46,332	2,243	.....	48,575
At sea by scows.	86,717	13,197	33,740	133,654
Sold to farmers .....	.....	30,836	.....	30,836
East Boston, by Thomas Mulligan .....	.....	3,744	.....	3,744
Brighton, by Allen Clarke.....	.....	1,395	.....	1,395
Totals	320,571	51,415	33,740	405,726

Comparative Table showing Cost of collecting Ashes and Offal and delivering same at Dumps.

Cost per cart-load, including administration expenses . . .	\$1.29
“ “ “ minus “ “ . . .	1.26
“ “ “ of ashes, labor only . . .	.81
“ “ “ “ “ hired teams, including contracts . . .	.62
“ “ “ “ “ labor, hired teams, and contracts . . .	.73
“ “ “ “ “ offal, labor only . . .	2.43
“ “ “ “ “ hired teams, including contracts . . .	2.09
“ “ “ “ “ labor, hired teams, and contracts . . .	2.37
“ “ scow-load to transport garbage to sea . . .	92.18
“ “ cart-load “ “ “ “ . . .	.21

Material collected and Cost of Hired Teams.

	South Yard.		West Yard.		Roxbury Yard.		Charles-town Yard.		E. Boston.		Brighton.		So. Boston, east of Dor. st., Mohan con- tract.		West Roxbury, south of Seaver and Boylston, and Doonan con't.		Dor., south of Park, School, and Harvard, and Bradley con't.		Total.	
	Single team.	With extra man.	Single team.	With extra man.	Single team.	With extra man.	Single team.	With extra man.	Single team.	With extra man.	Single team.	With extra man.	Single team.	With extra man.	Single team.	With extra man.	Single team.	With extra man.	Single team.	With extra man.
Days' work	9,726½	6,810	1,748½	1,720½	3,617	2,068	152½	125½	1,679	1,550	215½	215½	3	9,054	7	4	5	17,139	29,628½	
Number of { Ashes, loads coll'd {	65,311	1,884	12,898	12,898	15,817	2,312	1,001	22	13,372	1,374	1,505	2	1,395	3	9,054	4	9,148	5	4,967	133,073
Total	67,195		12,898		18,129		1,023		17,116		2,900			9,054		9,148		4,967		142,430
Amount expended .	\$42,829 50		\$8,686 50		\$14,987 00		\$708 50		\$18,712 50		\$3,877 50			\$4,791 60		\$4,143 75		\$2,904 19		\$101,641 04

Contract. 1 \$8,000 00 per year.

" 2 2,800 00 " "

" 3 5,750 00 " "

" 4 5,850 00 " "

" 5 4,100 00 " "

Expenses of Dumping-boats.

Amount expended for	Royalties (per year)	. . .	\$1,500 00	
" " " Rental	" " . . .	. . .	5,275 50	
				\$6,775 50
" " " Towing by department tow-boat	*	\$4,091 84		
" " " Towing by hired tow-boat		4,652 98		
				8,744 82
" " " Wharfage	. . .	. . .		1,833 37
" " " Repairs on boats	. . .	\$4,126 18		
" " " " " wharf	. . .	627 05		
				4,753 23
" " " Labor, captain	. . .	\$1,500 00		
" " " " " crew and dumpers	. . .	3,800 05		
				5,300 05
" " " Dredging	. . .	. . .		600 00
" " " Insurance	. . .	. . .		100 00
" " " Incidentals, Disinfectants	. . .	\$126 52		
	Inspection of scows	71 00		
	Manila rope	36 99		
	Telephone	30 00		
	Blocks, cleats, etc.,	24 75		
	Compass	25 00		
	Log	18 00		
	Marine glass	12 00		
	Stove, etc.	14 00		
	Coal	10 90		
	Salt	6 00		
	Hoops, etc.	2 00		
				377 16
				<u>\$28,484 13</u>

* Paid Sewer Division towards maintenance of boat.

Number of trips to sea by department tow-boat 202

Number of trips to sea by hired tow-boat 107

309

Cost per trip, \$92.18.

Number of cart-loads of garbage carried to sea, 133,654.

Cost per cart-load, 21 cents.

April 14, 1893, department tow-boat, the "Cormorant," commenced work.

Number of Carts collecting House-dirt, Ashes, and Offal.

Offal wagons owned by Sanitary Division	. . . . .	93	
" " in use " Thomas Mulligan, East Boston	. . . . .	6	
" " " " Allen Clark, Brighton	. . . . .	2	
			101

Capacity of Offal-wagons.

During the fall of 1892, 24 offal-wagons were measured and contents weighed for the purpose of obtaining the capacity of wagons and the weight of offal per cart-load. Their capacity averaged $3\frac{3}{4}$ cord ft., or 56.25 cu. ft., and the weight averaged 3,115 lbs. A cord equals 128 cu. ft., or 7,091 lbs. Price per cord for offal same as 1892: South yard, \$4.00; Highland yard, \$5.00; Charlestown yard, \$4.00.

Ash-carts.

Ash-carts owned by Sanitary Division	162	
" in use " Wm. F. Hedrington, East Boston	. . . . .	6	
" " " James Doonan, West Roxbury	. . . . .	7	
" " " John Bradley, Dorchester	. . . . .	4	
" " " Francis J. Mohan, South Boston	. . . . .	4	
Market-wagons owned by Sanitary Division	. . . . .	7	
			190
Grand total	. . . . .		<u>291</u>

Cost of Carts.

1884.	Ash-carts	.	.	.	.	.	\$148 00
1886.	"	.	.	.	.	.	142 00
1888.	"	.	.	.	.	.	107 00
1891.	"	.	.	.	.	.	133 00
1892.	"	.	.	.	.	.	142 00
1893.	"	.	.	.	.	.	142 00

**Account of the Number of Loads of Material collected from
1882 to February 1, 1894.**

YEAR.	Ashes.	Offal.	Street-sweepings.	Cesspool-matter.	Total loads.
1882 ...	151,197	28,385	52,381	10,051	250,014
1883 ...	169,610	27,408	58,272	8,801	264,091
1884 ...	182,642	28,520	62,222	12,578	285,962
1885 ...	193,734	31,206	61,455	13,151	299,546
1886 ...	209,129	33,170	59,875	11,392	313,566
1887 ...	220,186	36,724	68,990	14,333	340,233
1888 ...	233,154	37,709	68,019	¹ 5,644	344,886
1889 ...	227,325	40,183	70,476	.....	337,984
1890 ...	245,730	40,525	70,449	.....	356,704
1891 ...	² 313,464	46,742	³ 10,564	.....	370,770
1892 ...	303,878	46,343	.....	.....	350,221
1893 ...	320,571	⁴ 51,415	.....	.....	371,986
	2,778,980	448,330	582,703	75,950	3,885,963

¹ July 1, 1888, the Sewer Department commenced cleaning out cesspools.

² Ashes from January 1, 1891, to May 1, 1891 104,046
 Ashes from May 1, 1891, to February 1, 1892 209,418

313,464

³ May 1, 1891, the Street-Cleaning Division commenced cleaning streets.

⁴ Thomas Mulligan, East Boston, collected 3,744
 Allen Clarke, Brighton 1,395

5,139

Cost of Horseshoeing and Blacksmithing.

		Division Shop.	Outside Shops.
Stock	\$1,556 79		
Labor	3,311 88		
		\$4,868 67	\$667 11

NUMBER OF SHOES PUT ON.

Horses owned by Sanitary Division	10,782
" " " Street-Cleaning Division	2,208
" " " Paving Division	834
Total	<u>13,824</u>

Average cost per shoe, about 35 cents.

BLACKSMITHING.

Teams and carts repaired at division shop.

Stock	\$1,433 45
Labor	4,015 50
	<u>\$5,448 95</u>

Amount and Payments made under O'Connor Bros.

CONTRACT FOR REFUSE TIN CANS.

Date.	Weight.	Price per ton.		Amount.	Less.	Bills sent City Collector for collection.
					Wegher's fees.	
April 1, 1893	10 tons.	\$5.50	.....	\$55.00	.....	\$55.00
April 1, "	11 ¹⁴⁵⁶ / ₂₂₄₀ "	.....	\$3.50	40.77	.....	40.77
May 1, "	27 ²⁵⁰ / ₂₅₀ "	.....	"	94.89	.....	94.89
June 1, "	13 ³⁸⁰ / ₃₈₀ "	.....	"	46.09	.....	46.09
July 1, "	12 ⁷⁵⁰ / ₇₅₀ "	.....	"	44.39	.....	44.39
Aug. 1, "	6 ²⁵⁰ / ₂₅₀ "	.....	"	21.47	.....	21.47
Sept. 1, "	9 ²²⁵ / ₂₂₅ "	.....	"	32.95	.34	32.61
Dec. 1, "	24 ⁵⁶⁰ / ₅₆₀ "	.....	"	84.88	.....	84.88
Feb. 1, 1894	21 ¹⁸⁹⁰ / ₁₈₉₀ "	.....	"	76.45	.....	76.45
Feb. 1, "	1 ⁴⁷⁰ / ₄₇₀ "	.....	"	5.80	.30	5.50
<hr/>						
	10 tons.	\$5.50		\$502.69	.64	\$502.05
	128 ⁷¹ / ₂₂₄₀ "		\$3.50			

Hay and Grain.

Account of Hay, Grain, and Straw fed out and used February 1, 1893, to February 1, 1894.

	Bales.	Bushels.	Pounds.	Total Cost.	Cost per Horse per day.	Lbs. per Horse per day.	Horses. Divisions: San. Street-Cl.
{ Hay	2,464	.....	559,712	\$5,614 38	\$0.12 ²⁴²¹⁴	12 ²⁴²¹⁴	
{ Oats .....	.....	.....	671,792	9,170 52	.20 ³¹⁶³²	15 ²⁷²	32,801 11,967
{ Shorts .....	.....	20,993	17,760	182 00	.182 00	177 60	44,768
{ Straw	379	.....	82,925	692 35	.01 ²⁴⁴⁶⁷	1381 57	
{ Corn .....	.....	.....	166,040	1,672 30	.03 ³²⁹²⁶	331 73 6	Average per
{ English vegetable food	15½ bbls	.....	3,100	232 50	.232 50	31 00	day, 33
{ Salt	5 sacks	.....	.....	3 45	.345	.....
{ Carrots .....	.....	.....	2,705	16 23	16 23	27 05	
Total .....	.....	.....	1,504,034	\$17,583 73	\$0.39 ¹²⁴²¹	33 ²⁶⁶⁹⁰	
					44768		
{ Hay	2,110	.....	488,681	\$4,906 06	\$0.16 ⁵²⁷⁸	16 ³³⁵³	18,827 11,506
{ Oats .....	.....	15,425 10	493,610	6,737 86	.22 ²⁴⁴⁶	16 ⁵²⁵²	30,333
{ Shorts .....	.....	.....	6,000	59 00	.59 00	60 00	
{ Straw	339	.....	79,905	660 76	.02 ⁵⁴¹⁰	219 23 2	Average per
{ English vegetable food	8 bbls.	.....	1,600	120 00	120 00	16 00	day, 32
{ Salt	3 sacks	.....	.....	1 95	.195	.....
{ Carrots .....	.....	.....	2,390	14 33	14 33	23 90	
Total .....	.....	.....	1,072,186	\$12,499 96	\$0.41 ⁶³⁴³	35 ¹⁰⁵³¹	
					30333		

Hay and Grain. — Concluded.

	Bales.	Bushels.	Pounds.	Total Cost.	Cost per Horse per day.	Lbs. per Horse per day.	HORSES. Divisions: San. Street-Cl.
Charlestown- yard Stable.	Hay	699	151,131	\$1,453 31	\$0.166883	17,403.0	
	Oats	4,052½	129,670	1,789 16	.203530	14,852.3	6,079
	Shorts		7,789	79 95	.7789	77.89	2,574
	Straw		14,051	107 24	.012071	153.98	8,653
	Corn	111	6,216	67 15	.6715	621.6	
	English vegetable food		600	45 00	.4500	600	Average per
	Salt			1 40			day,
	2 sacks			10 38			17
	Carrots		1,730		.1730	1730	7
	Total		311,187	\$3,553 59	\$0.41585	35833.3	
Highland- yard Stable.	Hay	1,139	253,100	\$2,485 62	\$0.1317188	14,392.8	
	Oats	7,490½	239,696	3,254 49	.185085	13,779.8	16,338
	Shorts		11,547	122 28	.12228	115.47	1,460
	Straw		32,520	251 95	.017397	1147.22	17,798
	Corn	920	51,520	533 05	.0217709	2159.24	Average per
	English vegetable food		1,000	75 00	.7500	1000	day,
	Salt			37			45
	½ sack			13 92			2320
	Carrots		2,320				
	Total		591,703	\$6,736 68	\$0.3715142	33,436.9	

Recapitulation.

MATERIAL.	Pounds.	Cost.	HORSES PER DAY.		Number of Horses fed.
			Cost.	Fed out, Pounds.	
Hay	1,452,631	\$14,459 37	\$0.14 $\frac{31209}{101552}$	14,300.03	Sanitary Division, 74,045 Street-Cleaning Division, 27,507
Oats	1,534,778	20,952 03	.20 $\frac{61183}{101552}$	15,114.88	
Shorts	43,096	443 23	.43 $\frac{323}{101552}$	43.096	
Straw	209,401	1,712 30	.01 $\frac{62678}{101552}$	242.97	Total, 101,552
Corn	223,776	2,272 50	.02 $\frac{21146}{101552}$	220.72	Average number per day :
English vegetable food.	6,300	472 50	.47 $\frac{250}{101552}$	43.00	Sanitary Division, 203.
Salt.....	.....	7 17	.71	.....	Street-Cleaning Division, 76.
Carrots	9,145	54 86	.54 $\frac{86}{101552}$	91.45	
	3,479,127	\$40,373 96	\$0.39 $\frac{76898}{101552}$	34,263.59	

74,045 Sanitary Division horses (average per day 203) } at \$0.39 $\frac{76898}{101552}$ = \$29,438 02
 27,507 Street-Cleaning Division horses (average per day ... 76) } at \$0.39 $\frac{76898}{101552}$ = 10,935 94

101,552 horses (average number per day 279) at \$0.39 $\frac{76898}{101552}$ = \$40,373 96

HOUSE-OFFAL.

There are employed in removing house-offal 191 men and 101 wagons. The offal is removed from dwelling-houses twice a week during the summer months and once a week during the winter; from hotels, markets, and restaurants it is removed daily. There are sixty-two routes. The men are required to enter the yards, collect the offal, and empty the same into wagons, then drive to one of the depots, located as follows: one on Albany street, one on Highland street, Roxbury, and one at the Almshouse, Charlestown; also to the dumping-boat wharf on Atlantic avenue.

The offal is sold to farmers of adjoining towns mostly; the balance is dumped on the scow and carried to sea. About 26 per cent. of the quantity collected during the past year has been disposed of in this manner.

HOUSE-DIRT AND ASHES.

In the collection of house-dirt and ashes there are employed 221 men and 190 carts. This material is removed from hotels, tenement-houses, and stores daily; from dwelling-houses once a week. There are eighty-two regular routes. The City Ordinances of 1892 require that house-dirt and ashes shall be kept in an easy, accessible place for removal, the men being obliged to enter yards and areas, remove receptacles to the sidewalk, where their contents are loaded upon teams. The receptacle is then replaced in its original position. The material is disposed of, if possible, on low lands, being used for filling, and also dumped on scows to be carried to sea. Of the amount collected last year 27 per cent. was disposed of at sea.

During the year the removal of ashes and dirt in three sections of the city was let out by contract, to wit: territory lying east of Dorchester street, South Boston, part of Dorchester lying south of Park, School, and Harvard streets, also the part of West Roxbury lying south of Seaver and Boylston streets.

Horse Account.

1893.		Dr.	1893.		Cr.
Jan. 1.	On hand,	197	Jan. 29.	Died,	1
Jan. 3.	Purchased,	2	Feb. 21.	"	1
Jan. 11.	"	2	Feb. 22.	"	1
Jan. 19.	"	2	March 7.	Killed,	1
April 3.	"	2	May 19.	Trans. to Austin Farm,	2
April 7.	"	2	June 16.	Died,	1
April 10.	"	2	June 27.	Killed,	1
Aug. 3.	"	1	June 29.	Died,	1
Aug. 10.	"	1	Sept. 29.	Exchanged,	4
Sept. 12.	"	1	Oct. 6.	Killed,	1
Sept. 25.	"	3	Nov. 14.	"	1
Oct. 31.	"	1	Dec. 14.	"	1
Dec. 2.	"	2	1894.		
Dec. 11.	"	2	Jan. 4.	Died,	1
1894.			Jan. 11.	Killed,	2
Jan. 5.	"	1	Jan. 15.	"	1
Jan. 12.	Trans. from Pav. Div.	1	Jan. 31.	On hand,	202
	Total,	222		Total,	222

ORGANIZATION, 1894.

1 deputy superintendent.
5 clerks.
4 foremen.
1 captain of scows.
5 sub-foremen.
2 inspectors.
16 mechanics.
2 talley-men or aids.
5 watchmen.
4 feeders.
4 messengers.
8 stablemen.
10 yardmen.
15 dumpers.
207 ash-cart drivers and helpers.
146 offal-cart drivers and helpers.
—
435 employees.

The mechanics of this division are engaged in the construction of new wagons and carts, the painting and repairing of same, shoeing of horses for the Paving, Street-Cleaning, and Sewer Divisions, also the making and repairing of harnesses.

APPENDIX D.

REPORT OF THE DEPUTY SUPERINTENDENT OF
THE SEWER DIVISION.

CITY HALL, ROOM 44, BOSTON, February 1, 1894.

MR. H. H. CARTER, *Superintendent of Streets*:

DEAR SIR: I herewith submit my report of work done and expenditures of Sewer Division from February 1, 1893, to January 31, 1894.

Yours respectfully,

H. W. SANBORN,
Deputy Supt. Sewer Division.

Financial Statement.

Appropriations.		Balances on hand Feb. 1, 1893.	Appropriations added during the year.	Total Credits.	Expenditures during the year.	Balances on hand Jan. 31, 1894.
Sewer Division						
Sewer, between Roslindale and West Roxbury			<i>a</i> \$373,517 38	\$373,517 38	<i>b</i> \$373,517 38	\$280 00
Sewers, Brighton		<i>c</i> \$100 00	280 00	380 00	100 00	2,486 47
Sewer Outlets, East Boston		2,486 47		2,486 47		
Sewer Outlets, D street (all transferred).		1,762 95		1,762 95		
Sewers, South Boston						
Sewers, Ward 23, etc.		3,475 14		3,475 14	1,127 09	2,348 05
Sewers, Westville, Freeman, and Charles streets		716 41		716 41	125 12	591 29
Stables and Sheds, Brighton		<i>d</i> 215 00		215 00	215 00	
Tow-boat		5,957 92		5,957 92	5,957 92	
Laying Out and Construction of Highways		12,432 50	285,000 00	12,432 50	12,432 50	
				285,000 00	260,724 44	24,275 56
		\$27,146 39	\$658,797 38	\$685,943 77	\$655,982 40	\$29,981 37

In addition to the above amount of \$655,982.40 there was expended on account of Paving Division for building catch-basins and sewers, necessitated by street construction, the sum of \$41,276.38, making a total of \$697,258.78.

a General Appropriation \$350,000 00

Transferred from Street Department, Paving Division 40,000 00

Less transfer to grade damages, Ward 24 \$1,325 00

Less transfer to Street-Cleaning Division 3,552 80

Less transfer to Paving Division 13,664 82

16,482 62

\$373,517 38

b In addition to the above, drafts belonging to "Laying Out and Construction of Highways," to the amount of \$55,289.99, were drawn on the Sewer Division appropriation, pending negotiation of loan.

c Original appropriation \$6,806.73, of which \$6,806.73 was transferred as follows:

To Baker street, Ward 23 \$2,000 00

To Crauston street 3,000 00

To Short street 1,806 73

\$6,806 73

d Original appropriation \$1,241.52, of which \$1,026.52 was transferred as follows:

To Dickens street \$785 00

To Grant street, Ward 24 241 52

\$1,026 52

IMPROVED SEWERAGE.

Office salaries	\$500 00
Pumping-station, inside	49,903 05
Pumping-station, outside	12,758 85
Engines and boilers	5,147 04
Main and intercepting sewers	13,370 56
Moon Island	14,711 14
Tow-boat	2,944 08
	<hr/>
	<u>\$99,334 72</u>

STONY-BROOK IMPROVEMENT.

Maintenance of main channel and tributaries	\$10,756 34
Building, stables, and sheds, Brighton	\$12,539 07
Less amount furnished by Paving Division	<u>2,104 00</u>
	<u>\$10,435 07</u>
Stable foundation, Pyncheon street	<u>\$941 50</u>
New tow-boat (partial payment)	<u>\$14,889 05</u>

MISCELLANEOUS.

Office expenses, including salaries of Deputy Superintendent, clerks, and draughtsmen; stationery, drawing materials, etc.	\$20,473 08
Engineering expenses, including salaries of engineers, instruments, etc.	26,376 85
Current expenses of 8 yards and lockers	23,808 74
Current expenses of 7 stables, including cost of horses, vehicles, harnesses, etc.	28,377 54
Repairing sewers	\$11,405 97
Less amount paid by Paving Division	<u>297 01</u>
	11,108 96
Cleaning and flushing sewers	13,716 60
Cleaning catch-basins	39,525 74
Repairing streets	\$620 66
Less amount furnished by Paving Division	<u>106 29</u>
	514 37
Building, repairing, and cleaning culverts and surface drains, not included in the Stony-brook system,	\$27,005 18
Less amount furnished by Paving Division	<u>22,459 10</u>
	4,546 08
Examining condition of sewers and catch-basins	4,631 39
	<hr/>
<i>Carried forward,</i>	<u>\$173,079 35</u>

<i>Brought forward,</i>	\$173,079 35
Work for departments and others, including inspection of construction of private sewers . .	2,431 07
House connections	4,472 57
Water-rates	4,361 09
Damages and claims	18,089 37
Holidays	17,741 04
Travelling and incidental expenses	4,238 29
Repairs of department buildings, stables, and yards,	3,609 65
Hardware, blacksmithing, and tools	9,451 42
Rubber goods	1,514 48
Engines and boilers, and repairs	1,166 29
Stock and supplies not included elsewhere . .	2,650 14
General repairs	848 28
	<hr/>
	\$243,653 04

NOTE. — The total amount expended by the Sewer and Paving Divisions, on account of Miscellaneous Expenditures, is \$266,515.44.

City Proper.

Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
Cambria st. ....	.....	.....	.....	\$15 00	Built in 1892. Final estimate.
Cove st.	Kneeland st. and Beach st.	288.87	18-in., pipe	1,007 97	Rebuilding.
Hereford st.	Beacon st. and Back st.	57.00	12-in., pipe	309 09	
Mystic st.	E. Canton st. and E. Brookline st.	69.67	12-in., pipe	393 24	Rebuilding.
Passageway	Garrison st. and W. Newton st.	248.07	12-in., pipe	233 89	
Revere st.	Garden st. and Rollins pl.	128.03	12-in., pipe	337 85	
Savoy st. ....	.....	.....	.....	1,350 12	Rebuilding.
South Margin st.	Pitts st. and Staniford st.	520.56	18-in., pipe	1,872 58	Rebuilding.
39 new catch-basins built and 78 repaired .....		.....	\$5,638 27	\$5,519 74	
Less amount furnished by Paving Division .....		.....	3,339 68	2,298 59	
				<u>\$7,818 33</u>	

Surface Drains built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

Lehigh st. ....	.....	189.00	12-in., pipe.	
The cost of this work is included in amount expended for culverts and surface drains.				

Work done for and paid by Paving Divison, City Proper.

STREETS.	CATCH-BASINS.		MANHOLES.		
	Built.	Repaired.	Built.	Repaired.	
Exchange st.....		6			
Auburn st.....	1	2		1	
North Hudson st.....				2	
Fleet st.....	1				
Washington and Water sts.....					Rep. street.
Arch st.....					Rep. street.
Beacon st.....	2	12		3	
Lehigh st.....	8	7		4	180 ft. 12-in. sewer.
So. Margin st.....	2	1		2	
Cove st.....		1		3	
West Chester Park and Boylston st.....	1				
Dwight st.....	1				
Stanhope st.....	1				
Randolph st.....	3				

SUMMARY.

20 catch-basins built.
 29 " repaired.
 15 manholes "
 Repairing streets.
 180 feet 12-in. sewer.

Charlestown.

Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
Alford st., Ward 4...	Malden Bridge and Main st.	609.85	12-in., pipe.	\$4,018 91	Rebuilding. House-drains reconnected.
Benedict st., Ward 5.	{ Lawrence st. and Ruth-	560.15	15-in., pipe.		
Mead st., Ward 4....	erford ave.	330.85	12-in., pipe.	559 77	
School-house court,	Main st. and Russell st. ...	327.45	12-in., pipe.	811 32	
Ward 4.....	Off Charles st.....	149.80	12-in., pipe.	245 38	
Sprague st., Ward 3.	{ Bunker Hill st. and	355.60	12-in., pipe.	593 18	Built in 1892.
Stacy st., Ward 5....	Princeton st....			68 64	
		2,333.70		\$6,297 20	
3 new catch-basins built and 31 repaired			\$1,947 72		
Less amount furnished by Paving Division			705 18	1,242 54	
Total				\$7,539 74	

Work done for and paid by Paving Division, Charlestown.

STREETS.	CATCH-BASINS.		MANHOLES.	
	Built.	Repaired.	Built.	Repaired.
Rutherford avenue .....	.....	5	.....	.....
City sq. and Park st.	1	.....	.....	.....

SUMMARY.

1 catch-basin built.

5 catch-basins repaired.

East Boston.

Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
Byron street, Ward 1	Saratoga and Pope streets	959.75	12-in., pipe.	\$1,409 50	
Bennington and Walley streets, Ward 1 .....	.....	.....	.....	1,794 45	Built in 1891.
Cowper street, Ward 1	Moore and Short streets	36.88	12-in., pipe.	110 86	
Curtis street, Ward 1	Saratoga and Chaucer streets	225.15	12-in., pipe.	270 66	
Lamson-st. extension, Ward 2 ..	Maverick and Porter streets	351.10	27-in. X 27-in., wood.	717 57	Tide-work.
Moore-street outlet, Ward 1	B., R. B., & L. R. R., and Cow- per street	108.60 125.56	4 ft. X 4 ft., wood. 4 ft. 6 in. X 4 ft. 9 in., brick.	2,323 02	Tide-work.
Prescott street, Ward 1	Saratoga and Bennington sts.	210.33	12-in., pipe.	404 25	
Wesley street, Ward 2	Saratoga and Chaucer streets	377.51	30-in. X 36 in., brick	2,041 90	Rebuilding. House-drains reconnected.
Byron street .....	.....	.....	.....	151 20	Built in 1892.
Bennington street	Wadsworth, easterly .....	.....	.....	359 10	Built in 1892. Final esti- mate.
14 new catch-basins built and 59 rebuilt.		2,394.88		\$9,582 51	
Less amount furnished by Paving Division				\$6,681 25	
				1,542 32	
				5,138 93	
				\$14,721 44	

Work done for and paid by Paving Division, East Boston.

STREETS.	CATCH-BASINS.		MANHOLES.		
	Built.	Repaired.	Built.	Repaired.	
Brooks and Morris streets.....	1				
Saratoga and Wordsworth streets.. . .	1				
Bennington and Orleans streets	1				
Bennington street ...	5				
Falcon and Meridian streets.....	1				
Gladstone street.....	2				

SUMMARY.

11 catch-basins built.

Brighton.
Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
Commonwealth ave., Ward 25.	Pleasant and Warren sts.	872.00	2 ft. 4 in. X 3 ft. 6 in., brick.	\$22,296 30	Built in 1892.
		1,483.05	12-in., pipe.		
		2,544.58	15-in., pipe.		
		403.20	24-in., pipe.		
Harvard ave. ....	.....	1,229.35	18-in., pipe.	59 25	
Englewood ave.	Lanark road and Chestnut Hill ave.	771.84	12-in., pipe.	2,812 78	Contract.
Kelly court .....	.....	.....	.....	22 30	Built in 1892. Final estimate.
Henshaw st., Wd. 25.	Washington and Menlo sts.	341.90	12-in., pipe.	387 32	
Henshaw st., Wd. 25.	.....	.....	.....	44 87	Built in 1892. Final estimate.
Market st., Ward 25.	130 ft. S. of School st. and No. 68 Market st.	284.51	18-in., pipe.	612 03	Contract.
Market st., Ward 25.	No. 68 Market st. and Wexford st.	360.00	15-in., pipe.	70 00	Contract. Partial payment.
		12.00	12-in., iron pipe.	2,910 17	Parsons' Brook connection with the Metropolitan main sewer, regulator, tide-gate, sump, overflow, and siphon manholes.
		12.00	36-in., iron pipe.		
		10.00	18-in., akron pipe.		
		28.45	24-in., brick.		
		479.10	2 ft. 4 in. X 3 ft. 6 in., brick.		
N. Beacon st., Wd. 25.	B. & A. R.R. and Met. main sewer	20.50	30 in. X 39 in. brick.		
Carried forward.		8,852.48	.....	\$29,215 22	

Brighton. — Concluded.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
<i>Brought forward.</i>					
Parsons st., Wd. 25.	N. Beacon and Faneuil sts.	8,852.48	3 ft. 9 in. X 4 ft. 0 in., brick.	\$29,215 02	Faneuil Valley sewer.
Parkman st. Outlet, Ward 25	Met. main sewer and B. & A. R.R.	275.00		2,770 44	{ Sump, regulator, tide-gate, and over- flow manholes, and connection with Metropolitan main sewer.
Private land, Wd. 25.	{ Met. main sewer and B. & A. R.R.	16.80 658.81	{ 24-in., brick. 2 ft. 8 in. X 4 ft. 0 in., brick.	1,604 67	{ Salt creek outlet, sump, regulator, tide-gate, and overflow manholes, and connection with Met. sewer.
Private land, Wd. 25.	{ A point on Com'nw'th ave. 515 ft. E. of Malvern st. and B. & A. R.R.	232.00	{ 3 ft. 6 in. X 3 ft. 9 in., brick.	{ C'st p'd for by City Engin'r. \$1,517 49	Outlet for Commonwealth ave.
Rena st., Wd. 25	Bertram st. and W'st'n ave.	9.77	15-in., pipe.		
Rockland st., Wd. 25.	W'st'n and Peaceable sts.	216.38	30 in. X 36 in. brick.	2,654 90	{ Sump and regulators, manholes, and connection with Met. main sewer.
Rockland st., Wd. 25.	Peaceable st. and 120 ft. s'ly	339.35	12-in., pipe.	575 56	
Spring st., Wd. 25.	Market and George sts.	120.50	12-in., pipe.	167 98	
Wexford st., Wd. 25.	Market and Hillside sts.	442.63	15-in., pipe.	533 95	
Wicklow st.		75.00	15-in., pipe.		Contract. No cost in to Jan. 31, 1894.
				99 92	Contract. No cost in to Jan. 31, 1894. Built in 1892. Final estimate.
Total		11,238 72		\$39,139 93	
23 new catch-basins built; 7 catch-basins and 3 water-catchers repaired.			\$2,187 10		
Less amount furnished by Paving Division.			1,367 16		
				819 94	
				\$39,959 87	

Culverts built between February 1, 1893, and February 1, 1894, by the City.

Commonwealth ave., Ward 25.....	Near Reedsdale st.....	150.00	3 ft. 0 in. X 4 ft. 4 in., stone.
Commonwealth ave. }	Griggs and Allston sts.....	{ 240.00	3 ft. 0 in. X 4 ft.
Ward 25.....		{ 330.00	4 in., stone.
			3 ft. 0 in. X 3 ft. 4 in., stone.

Surface Drains built between February 1, 1893, and February 1, 1894, by the City.

{ Commonwealth av., on southerly side, Ward 25.	160 ft. E. of Harvard ave. and Allston st.	602.27 431.88	24-in., pipe. 18-in., pipe.
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The cost of this work is included in the amount expended for culverts and surface drains.

Sewers built between February 1, 1893, and February 1, 1894, by Private Parties.

Bentley st., Ward 25.	Sparhawk and Henshaw sts.	462.07	12-in., pipe.
Eleanor st., Ward 25	Cambridge st. and Ridge- mont ave.	199.40	12-in., pipe.
Leicester st., Ward 25	Surrey and Washington sts.	247.45	12-in., pipe.
Private Land, Wd. 25	Cambridge st. and Ridge- mont ave.	268.35	12-in., pipe.
Ridgemont ave., Wd. 25	Eleanor st. and Allston Hts. Market and Parsons sts...	878.50 565.30	12-in., pipe. 12-in., pipe.
Surrey st., Ward 25			..... Outlet for Ridgemont avenue.

Work done for and paid by Paving Division, Brighton.

STREETS.	CATCH-BASINS.		
	Built.	Repaired.	
Henshaw and Market sts.	1		Filling.
Sparhawk and Bentley sts. ...	1		
Brighton yard. ....	.....	.....
Washington and Wirt sts. ...	6		
Arlington st.	2		
Englewood avenue and Sutherland road.	2		
Commonwealth ave.	431.88 ft. 18-in. storm sewer. 602.27 ft. 24-in. " " 775 ft. 3 ft. × 4 ft. 4 in. culvert. 611 ft. 3 ft. × 3 ft. 4 in. culvert. 72 ft. 4 ft. × 4 ft. wooden culvert.
Warren st. to Brighton	.....	.....
ave. ....	.....	.....

SUMMARY.

12 catch-basins built.

Filling.

431.88 feet 18-in. storm sewer.

602.27 feet 24-in. " "

775 feet 3 ft. × 4 ft. 4 in. culvert.

611 feet 3 ft. × 3 ft. 4 in. "

72 feet 4 ft. × 4 ft. wooden culvert.

South Boston.

Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
E st., Ward 15	Ninth st. and O. C. R.R. ..	209.60	12-in., pipe.	\$445 13	Contract. Contract. Partial payment.
Story st., Ward 14...	H st. and G st.....	485.00	12-in., pipe.	24 50	
Total		694.60		\$469 63	
16 new catch-basins built and 6 repaired			\$2,146 72		
Less amount furnished by Paving Division			2,033 74	112 98	
Total				\$582 61	
Sewers built between February 1, 1893, and February 1, 1894, by Private Parties.					
Wormwood st., Ward 13.	A st. and N.Y. & N.E. R.R.	475.00	12-in , pipe.		

**Work done for and paid by Paving Division, South
Boston.**

STREETS.	CATCH-BASINS.		MANHOLES.		
	Built.	Repaired.	Built.	Repaired.	
Third st., bet. A and B sts.				1	
Rawson st.	4			1	
Howell st.	4				
Mercer and Ninth sts.	2				
L st.	8			1	
Congress st.					6 washouts.

SUMMARY.

18 catch-basins built.
 6 shutes built.
 3 manholes repaired.

Dorchester.

Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
Adams st.	Linden and Bowdoin sts.	470.65	12-in., pipe.	\$3,636 78	All rock.
Armadine st.	Washington st. and Milton ave.	395.48	24 in. X 36 in., brick.	} 9,125 31	Contract.
Private land	Armadine and Rockwell sts.	513.20	15-in., pipe.		Considerable rock.
Rockwell st.	Private land and Milton ave. }	1,309.38	12-in., pipe.	} 942 01	
Barrington st.	Clarkson and Mt. Everett sts. }	286.55	15-in., pipe.		
		434.00	12-in., pipe.	} 2,168 90	Considerable rock.
		222.10	12-in., pipe.		
		150.00	10-in., pipe.	29 40	Built in 1892. Final estimate.
Buttonwood st.	Mt. Vernon and Grafton sts.	103.55	12-in., pipe.	.....	Relay; cost \$319.53, paid for by Paving Division.
Corwin and Westville sts.	Dalmatia and Dove sts.	133.15	12-in., pipe.	866 84	Considerable rock.
Dacia st., Ward 20	Danube st. and Howard ave. ....	.....	.....	122 34	Built in 1892. Final estimate.
Dewey st., Ward 20	Dorchester ave. and Freeman st.	480.57	12-in., pipe.	1,856 46	Contract.
Elm road, private land of Legg and Jacques, and Ashmont st. }	Park and Faulkner sts.	361.93	15-in., pipe.		
Faulkner st.	Faulkner st. and Shawmut Br. O. C. R.R.	189.60	12-in., pipe.	775 19	Much rock.
Private land		5,050.16	.....	\$19,523 23	
Freeman st.					

Carried forward

Dorchester.—*Continued.*

Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
<i>Brought forward.</i>					
Harvard st.	Glen road and N.Y. & N.E. R.R.	5,050.16	.....	\$19,523 23	Contract. Some rock.
Harvard st.	Kilton st. and N.Y. & N.E. R.R.	399.90	12-in., pipe. }	1,333 94	Contract. Much rock.
Harbor View st.	Newport st. and 130 ft. east..	151.50	12-in., pipe.	235 46	
Harbor View st.	Sydney st. and 200 ft. west..	146.82	12-in., pipe.	289 85	
Howe st.	End of existing sewer and 230 ft. westerly.....	233.17	12-in., pipe.		
Josephine st.	Existing sewer and Ditson st. }	254.80	12-in., pipe.	599 37	Contract. Much rock.
Ditson st.	Josephine and Westville sts. }	37.10	15-in., pipe.	502 87	Contract.
Lawrence ave. ....	.....	332.30	12-in., pipe.	72 25	Built in 1892. Final estimate.
Bowdoin ave.	At Mt. Bowdoin green.	205.47	10-in., pipe.	463 25	Built in 1892. Final estimate.
Maxwell st. ....	.....		.....	99 39	
Neponset ave.	Bertram st. and Pope's Hill st. }	1,000.00	15-in., pipe.	744 00	Contract. Partial payment.
Park st. ....	.....	200.00	12-in., pipe.	193 81	Built in 1892. Final estimate.
Park st.	Kilton and Whitfield sts.	400.00	18-in., pipe.	98 00	Contract. Partial payment.
Private land outlet for Stockton st.	Rockwell and Stockton sts.	159.19	18-in., pipe.	598 86	Contract.

DORCHESTER LOWER MILLS TRUNK SEWER.						
Private land of Churchill ..	Dorchester ave. and Wash- ington st.	1,738.00	30 in. X 36 in., brick.	\$18,334 05	Some rock.	
Private land of N. F. Safford heirs, and Eunice B. Rug- gles	Washington and Morton sts.	255.00	24 in. X 36 in., brick.			
Private land of N. F. Safford heirs, and F. M. Cain <i>et al.</i>	Morton and Sanford sts.	211.20	18-in., pipe.	1,610 27	Much rock.	
Private land	Carson st. and Moseley ave. . .	400.00	12-in., pipe.			
Moseley ave.	Mt. Vernon st. and Crescent ave.	190.00	18-in., pipe.	324 00	Contract.	
Sanford st.	Washington and Cedar sts.	420.00	12-in., pipe.			
Savin Hill ave. ....	.....	.....	.....	120 32	Built in 1892. Final esti- mate.	
Sturbridge st.	Sanford and River sts.	45.00	15-in., pipe.	53 44	Contract.	
Toplift st. ....	.....	.....	.....	133 02	Built in 1892. Final esti- mate.	
Whitefield st.	Existing sewer and Rosedale ave.	178.25	12-in., pipe.	314 45	Contract.	
Rosedale ave.	Whitfield and Washington sts. ....	.....	.....	.....	.....	.....
Winter st.	Existing sewer and 115 ft. south	114.75	10-in., pipe.	439 89	Considerable rock.	
Wrentham st. ....	.....	.....	.....	323 29	Built in 1892. Final esti- mate.	
38 new catch-basins built and 27 repaired	.....	12,123.61	.....	\$46,407 01	.....	.....
Less amount furnished by Paving Division	.....	.....	.....	.....	.....	.....
Total .....	.....	.....	.....	4,511 16	.....	.....
	.....	.....	.....	\$50,918 17	.....	.....

Dorchester. — *Continued.**Sewers built between February 1, 1893, and February 1, 1894, by Private Parties.*

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
Belfort st.	Auckland st. and Dorchester ave.	344.00	12-in., pipe.		
Bellflower st., Ward 15	Dorchester ave. and Boston st.	340.00	12-in., pipe.		
Chamblett st., Ward 20	Magnolia and Hartford sts.	433.15	12-in., pipe.		
Chamberlain st. . .	Harvard and Cook sts.	364.60	12-in., pipe.		
Cook st.	Chamberlain and Washington sts.	183.20	12-in., pipe.		
Dalkeith st., Ward 20	Wayland st. and Howard ave., Dalkeith and Dalmatia sts.	450.12	12-in., pipe.		
Howard ave., Ward 20	Existing sewer and Folsom st., Topliff and Draper sts.	97.70	10-in., pipe.		
Homes ave.	Waldeck st. and 625 ft. S.W., Montague and Waldorf sts.	166.90	15-in., pipe.		
Linsey st.		625.75	12-in., pipe.		
Mellen st.		250.25	12-in., pipe.		
Oakley st.	Geneva ave. and Bowdoin st., Sydney and Sagamore sts.	339.85	15-in., pipe.		
Romsey st.	Whitfield and Washington sts., Hartland and Romsey sts.	442.00	12-in., pipe.		
Rosedale ave.		613.65	12-in., pipe.		
Saxton st.	Waldeck st. and 400 ft. S.W., Washington st. and Milton ave.	140.75	12-in., pipe.		
Stratford st. . .		405.69	12-in., pipe.		
Stockton st. and outlet.	Rockwell and Stockton sts. . .	1,124.23	12-in., pipe.		
		113.96	18-in., pipe.		

Waldeck-st. extension	Geneva ave. and Park st. ...	{ 315.35 765.32 678.00 8,606.22	{ 15-in., pipe. 12-in., pipe. 12-in., pipe.			
Wolcott st.	Eric and Columbia sts.					
Total .....	.....				
<i>Surface Drains built between February 1, 1893, and February 1, 1894, by the City.</i>						
N.Y. & N.E. R.R. location, south-west from Quincy st. }	.....	43.04	{ 3 ft. x 3 ft., brick.			
Stockton st.	Culvert and Milton ave.	412.50	{ 12-in., pipe.			
Tremlett Park	Catch basins and culvert.	171.00	{ 12-in., pipe.			
Total .....	.....	626.54				

The cost of this work is included in amount expended for culverts and surface drains.

Culverts.

Armadine st. (upper)	{ About 500 ft from Washing- ton st.	{ 43.45 41.41 52.70 137.56	{ 18-in., double thick pipe. 24-in., double thick pipe. 24-in., double thick pipe.			Including special catch- basins.
Rockwell st.	About 500 ft. from Washing- ton st.					
Stockton st.	About 500 ft. from Washing- ton st.					
Total .....	.....				

Double culvert.

The cost of this work is included in amount expended for culverts and surface drains.

**Work done for and paid by Paving Division,
Dorchester.**

STREETS.	CATCH-BASINS.		MANHOLES.		
	Built.	Rep'd.	Built.	Rep'd.	
Houghton st. ...	4	.....		1	1 washout.
Grampian Way..	1	.....			1 washout.
Dacia st. ....		.....			Relaying 198 ft.
					sewer.
Clarkson and Barrington sts.	1				
Duncan and Granger sts.	2				
Brent st.	1				
Dorchester ave. and Adams sts.	2				
Sawyer ave. ....	.....	.....	3		
Harvard st.	2				

SUMMARY.

13 catch-basins built.
 2 washouts "
 3 manholes "
 1 manhole repaired.
 198 ft. sewer relaid.

Roxbury,
Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
Boylston st.	Parker st. and W. Chester park	291.61	18-in., pipe.	\$1,741.32	{ Connection with improved sewerage. Built in 1892.
Brookline ave.	Across Muddy river. ....	.....	.....	291.59	
Cary st.	Ruggles st. and Terry st.	645.22	12-in., pipe.	4,548.40	{ Passing through Stony-brook conduit, also concrete foundation.
Centre st. ....	.....	.....	.....	30.09	Final estimate, built in '92.
Commonwealth ave.	Beacon st. and Essex st.	437.80	18-in., pipe.	2,088.90	{ Bad bottom. Concrete and gravel foundation.
Calumet st.	End of old sewer and Hillside st.	151.89	{ 15-in., pipe.	1,004.41	Much rock.
Hillside st.	Calumet and Sachem sts.	72.50			
Cleveland st.	Moreland st. and Winthrop st.	274.21	12-in., pipe.	1,536.66	Much rock.
Hillside, Sunset, and Eldora sts. ....	.....	.....	.....	38.95	Built in '92 (final estimate).
Hillside st.	End of old sewer and Pontiac st.	38.00	12-in., pipe.	73.35	
Hillside st.	End of existing sewer and Calumet st.	346.33	12-in., pipe.	611.25	Built in '92 (final estimate).
Humboldt ave.	Brookledge st. and Seaver st. ....	.....	.....	42.50	
<i>Carried forward.</i>		2,257.56	.....	12,007.42	

Roxbury. — Continued.

Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
<i>Brought forward,</i> Huntington ave.....	Vancouver st. and Long- wood ave.....	2,257.57	.....	\$12,007.42	
Heath st.	Bickford st. and Parker st. Commonwealth ave. and W. Newbury st.....	271.37	.....	1,086.52	Built in 1892.
Kenmore and West Newbury sts.....	Kenmore and Charlesgate (west).....	210.39	12-in., pipe.	499.63	Built by contract.
Lawn st.....	.....	96.46	2 ft. 6 in. X 3 ft. 0 in., brick.	2,794 74	
Longwood ave.....	Huntington ave. to Bum- stead lane.....	.....	.....	35 02	Built in 1892. Final esti- mate.
Longwood ave.....	Huntington ave. and Worth- ington st. ....	.....	.....	263 92	Built in 1892.
Longwood ave.....	Brookline ave. and Wiggles- worth st.	195 26 212.22	12-in., pipe.	402 39	
Mountfort st.....	.....	835.99	24-in., pipe.	} 4,458 34	
Mt. Pleasant ave...	.....	651.47	15-in., pipe.		
Norfolk ave.....	Arundel st. and Beacon st	402.05	12-in., pipe.	1,259 52	
	Ames 40-ft. strip and Clapp st.....	.....	.....	152 26	Built in 1892.
Norfolk ave.....	Clapp st. and Magazine st.	102.09 603.00	8 ft. 0 in. X 8 ft. 6 in., brick.	10,355 92	Piles used on part of foun- dation.
		676.88	2 ft. 8 in. X 4 ft. 0 in., brick.	} 20,218 60	
		31.61	2 ft. 6 in. X 3 ft. 0 in., brick.		Piles used on part of foun- dation.
			15-in., pipe.		

Raleigh st.	Bay State road and Charles river.	150.84	12-in., pipe.	\$323 81	Rebuilding.	Part tide work.
St. Stephen st.	Gainsboro' st., westerly	124.57	2 ft 6 in. X 3 ft. 0 in., brick.	2,640 76	Piles.	
Smith st. ....		..	.....	17 79	Built in '92.	Final estimate.
Sunset st.	Eldora st. and Pek'r Hill av.	106.57	12-in., pipe.	346 69		
Sewall st.	Tremont st. and Dell ave.	285.18	12-in., pipe.	1,911 48	Much rock.	
Shirley st.	Norfolk ave. and George st.	473.00	2 ft. 6 in. X 3 ft. 0 in., brick.	4,663 05		
Townsend st.	Harold st. and Humboldt ave.	190.00	12-in., pipe.	2,155 25	Much rock.	
	{ Back Bay Fens and } { Brookline ave. }	42.79 1,437.47 27.20 24.17	2 ft., circular brick. 3 ft. 3 in. X 3 ft. 5 1/2 in., brick. 30 in. X 36 in., slants in man- holes in sump and regulator.	18,932 71	Piles.	
Woodbury st. ...	Shawmut ave. and Wash- ington st.	157.86	12-in., pipe.	384 42	Built in '92.	Final estimate.
Worthington st. ....		..	.....	50 88		
		9,566.00		\$84,961 12		

Sewers built between February 1, 1893, and February 1, 1894, by the City, by Contract under Act of 1891, as amended by Act of 1892.

Batavia street {	St. Stephen st. and Parker street	{	501.86 68.40 520.00	{	2 ft. 6 in. X 3 ft., brick. 10-in., pipe. 6-in., pipe.	} \$5,027 04
Bay State road ... {	Raleigh st. and Sherborn street	{	595.37 699.44 20.00 165.53 1,004.59 165.00 2,309.50	{	2 ft. 6 in. X 3 ft., brick. 18-in., pipe. 12-in., pipe. 15-in., pipe. 12-in., pipe. 10-in., pipe. 6-in., pipe. 7 catch-basins. 7 drop inlets.	} \$11,734 00
Carried forward, ...			6,049 69			\$101,722.16

Carried forward,

Roxbury. — Concluded.

Sewers built between February 1, 1893, and February 1, 1894, by the City, by Contract under Act of 1891, as amended by Act of 1892.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
<i>Brought forward,</i>	.....	6,049.69	.....	\$101,722.16	
Deerfield street .. {	.....	752.13	18-in., pipe.	3,291 64	
	Commonwealth ave. and	249.96	12-in., pipe.		
	Charles River	42.00	10-in., pipe.		
	.....	39.50	6-in., pipe.		
Miner street..... {	.....	368.00	2 catch-basins.	1,431 39	
	Beacon st. and B. & A.	29.52	12-in., pipe.		
	R.R.	450.00	10-in., pipe.		
	.....	.....	6-in., pipe.		
34 new catch-basins built and 44 repaired ..		7,980.80	2 catch-basins.	\$106,445 19	
Less amount furnished by Paving Division .....		.....	.....	4,411 19	
				\$110,856 38	

Sewers built between February 1, 1893, and February 1, 1894, by Private Parties.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
Avon place.....	End of old sewer and Green-leaf st.....	126.42	12-in., pipe.		
Bumstead lane.....	Smith st. and Tremont st..	407.33	12-in., pipe.		
Cardington st.....	Fenner st. and Cobden st..	113.45	12-in., pipe.		

Dunford st.....	Fenner st. and Cobden st...	108.91	12-in., pipe.	<i>Surface Drains built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.</i>
Fenner st.....	Washington st. and Card- ington st.....	192.54 417.59	18-in., pipe. 12-in., pipe.	
Harold st.....	Holland st. and Hamerton st.....	230.29	12-in., pipe.	
Hamerton st.....	Humboldt ave. and Harold st.....	270.20	12-in., pipe.	
Holborn st.	M. H. east of Galena st. and top of hill.....	126.13	12-in., pipe.	
Passageway.....	Off Parker st., opp. Astor st.....	357.48	12-in., pipe.	
Pontine st.....	Norfolk ave. and Clifton st.	176.69	12-in., pipe.	
Rochdale st.....	Fenner st. and Cobden st...	96.26	12-in., pipe.	
Turner st.....	Haviland st. and Caledonia st...	192.04	12-in., pipe.	
Wigglesworth st...	Huntington ave. and Long- wood ave.....	212.49	12-in., pipe.	
Bay State road.....	Raleigh st. and Beacon st..	156.00	12-in., pipe.	
Commonwealth ave.	Beacon st. and Kenmore st. Easterly from Brookline ave.....	260.96 161.04 94.33	15-in., pipe. 12-in., pipe. 24-in., pipe.	
Commonwealth ave.....	Beacon st. and Essex st...	1,047.70 1,808.15 652.00	15-in., pipe. 12-in., pipe. 10-in., pipe.	
Raleigh st.....	Beacon st. and Charles river.....	390.78	24-in., pipe.....	
		<u>4,570.96</u>		
Partly tide work.				
The cost of this work is included in amount expended for culverts and surface drains.				

Work done for and paid by Paving Division, Roxbury.

STREETS.	CATCH-BASINS.		MANHOLES.		
	Built.	Repaired.	Built.	Repaired.	
Centre st.....	1				
Blue Hill ave....	1				
Centre and Mar-					
cella sts.....	1				
Cobden st.	1				
Sunset st.....	1				
Beacon st., Ward					
22.	2				
Smith st.....	1				
Commonwealth					
ave. ....		.....	.....	.....	2,363 ft. 12-in., 15-
	15				in., and 18-in. pipe
Essex st. to					surface drain.
Cross Roads, }		.....	.....	.....	10 drop inlets built.

SUMMARY.

23 catch-basins built.
 10 drop inlets.
 2,363 ft. 12-in., 15-in., and 18-in. pipe surface drain.

West Roxbury (all in Ward 23).

Sewers built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
A st.	Boylston st. and Spring Park ave.	218.33	12-in., pipe.	\$1,566 20	Contract. Considerable rock. Built in 1892. Final estimate.
Albano st.	Washington and Clifton sts.	377.00	12-in., pipe.	566 09	Contract.
Ashfield st.	Brandon and Prospect sts.,	135.75	10-in., pipe.	26 44	Built in 1892. Final estimate.
Amherst st.	Poplar and Ashland sts.,	816.05	12-in., pipe.	406 59	Contract. Some rock.
Brown ave.	Orchard and May sts.	137.13	30 in. X 39 in., brick.	1,526 39	Contract. Some rock.
Centre st.	Centre and Pond sts.	15.00	10-in., pipe. }	1,856 97	
May st.	Paul Gore st. and Boylston terrace	75.00	12-in., pipe. }	207 34	Contract.
Centre st.	Lakeville pl. and Robinwood ave.	80.00	15-in., pipe.	1,311 60	All rock.
Forest Hills st.	Washington st. and Peter Parley road.	437.93	12-in., pipe.	1,748 33	Some rock.
Johnston st.	Jamaica st. and summit ...	597.20	10-in., pipe.	1,144 41	Contract.
Montview st.	Park and Mt. Vernon sts. ...	480.00	12-in., pipe.	807 56	Contract.
Mt. Vernon st.	Pleasant st. and Garfield ave.	260.00	15-in., pipe.	42 00	Contract. Partial payment.
Peter Parley st.	Forest Hills st. and Walnut ave.	188.22	10-in., pipe.	917 20	Contract. Rock.
Carried forward,		3,817.61	.....	\$12,149 96	

West Roxbury. — Continued.*Sewers built between February 1, 1893, and February 1, 1894, either by Contract or Day Labor.*

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
<i>Brought forward,</i>					
Pond st. {	Orchard and May sts.	3,817.61	15-in., pipe. }	\$12,149 96	
Pond st. {	May and Avon sts.	{ 1,249.80	12-in., pipe. }	2,297 32	
Prince st.	Pond st. and 1,600 ft. n'y towards Perkins st.	550.00	24-in., pipe. }	171 35	Contract. Partial payment.
		{ 675 00	15-in., pipe. }	92 56	Contract. "
		{ 900.00	12-in., pipe. }		
ROSLINDALE AND WEST ROXBURY TRUNK SEWER.					
Beech st.	Anavan ave. and private land.				
Private land.	Beech and Willow sts.	455.25	28 in. X 42 in., brick. }		
Corey st.	Land of O.C. R.R. and Centre st.	2,297.55	24 in. X 36 in., brick. }	26,759 61	Considerable rock.
Centre st.	Corey and Mt. Vernon sts., South and Elm sts.	282.37	15-in., pipe. }		
Sedgwick st.	Carolina ave. and Sedgwick st.	304.51	12-in., pipe. }	1,018 96	
Outlet and in private land.	Atherton ave. and Metropolitan ave.	{ 145.28	12-in., pipe. }	524 67	Contract.
Washington st.		{ 587.00	12-in., pipe. }	1,158 52	Contract. Some rock.
16 new catch-basins and 1 water-catcher built; 31 catch-basins and 4 water-catchers repaired		11,377.77		\$44,172 95	
Less amount furnished by Paying Division				\$2,334 17	
				1,052 05	
				1,282 12	
				\$45,455 07	

Sewers built between February 1, 1893, and February 1, 1894, by Private Parties.

Clement ave. {	Flora and Park sts.	131 80	24-in., pipe.
Flora st. {	Clement ave. and Kenneth st.	847 07	12-in., pipe.
Franklin Park terrace {	Olmsted st. and Walnut av.	545 47	12-in., pipe.
Hastings st. {	Centre and Montview sts. .	498 98	15-in., pipe.
Montview st. {	Hastings and Mt. Vernon sts. .	663 70	12-in., pipe.
Kenneth st.	Farrington ave. and Stratford ave.	258 10	12-in., pipe.
Locksley st.	Robinwood ave. (southerly)	449 35	12-in., pipe.
Moss Hill road	May and Pond sts.	427 28	12-in., pipe.
Olmsted st.	Forest Hills to Peter Parley st.	39 50	12-in., pipe.
Robinwood ave.	Centre and Enfield sts.	32 85	12-in., pipe.
Stratford ave.	Clement ave. and Anawan ave.	510 46	12-in., pipe.
Tower st.	Hyde Park ave. and Forest Hills Cemetery	901 08	12-in., pipe.
Woodlawn st.	Hyde Park ave. and Forest Hills Cemetery	{ 44 50	18-in., pipe.
		{ 431 80	15-in., pipe.
		{ 510 36	12-in., pipe.
		{ 284 83	15-in., pipe.
		{ 830 62	12-in., pipe.
		{ 499 23	12-in., pipe.
		{ 200 00	12-in., pipe.
		8,106.98	

West Roxbury. — Concluded.

Surface Drains and Culverts built between February 1, 1893, and February 1, 1894, by the City, either by Contract or Day Labor.

LOCALITY.		Length in Feet.	Dimensions and Material.	Cost.	Remarks.
Built in	Between				
Peter Parley st. . . .	{ Culvert in Forest Hills } { st. and Walnut ave. . . }	160.35 797.57 ----- 957.92	24-in., pipe. 18-in., pipe.		
The cost of this work is included in the amount expended for culverts and surface drains.					
<i>Culverts.</i>					
Forest Hills st.	{ Outlet for Peter Parley } { st. storm sewer }	40.80	24-in., pipe.	.....	Connects old culverts.
Grove st.		6.00	18-in., pipe.		
South st.		46.90	3 ft. 0 in. X 3 ft. 0 in., stone.		
		60.00	3 ft. 0 in. X 5 ft. 4 in., stone.		
		----- 153.70			
The cost of this work is included in the amount expended for culverts and surface drains.					

**Work done for and paid by Paving Division,
West Roxbury.**

STREETS.	CATCH-BASINS.		MANHOLES.		
	Built.	Repaired.	Built.	Repaired.	
Byron and School sts..	1				60 ft. culvert.
Peter Parley road	7				
South st.....	.....	.....	.....	.....
Keyes st.....	1				
Centre and Alarie sts..	1				

SUMMARY.

10 catch-basins built.
60 feet culvert.

RECAPITULATION.

SEWERS.

City Proper	\$5,519 74	
Charlestown	6,297 20	
Brighton	39,139 93	
East Boston	9,582 51	
South Boston	469 63	
Dorchester	46,726 54	
Roxbury	106,445 19	
West Roxbury	44,172 95	
	<hr/>	
		\$258,353 69

CATCH-BASINS.

City Proper	\$5,638 27	
Charlestown	1,947 72	
Brighton	2,187 10	
East Boston	6,681 25	
South Boston	2,146 72	
Dorchester	6,169 18	
Roxbury	8,703 49	
West Roxbury	2,334 17	
	<hr/>	
		35,807 90
Improved Sewerage maintenance	99,334 72	
Stony Brook maintenance	10,756 34	
Building stables and sheds, Brighton	12,539 07	
Stable foundation, Pynchon st.	941 50	
New tow-boat	14,889 05	
	<hr/>	
Carried forward,		\$432,622 27

<i>Brought forward,</i>	\$432,622 27
Miscellaneous	266,515 44
	<hr/>
	\$699,137 71
Less amount furnished in fiscal year 1893-94 by City Engineer for work performed in 1892-93 .	1,898 93
	<hr/>
	\$697,238 78
Less amount furnished in fiscal year 1893-94 by Paving Division	41,276 38.
	<hr/>
	<u>\$655,962 40</u>

**Summary of Sewer Construction for the Twelve Months
ending Jan. 31, 1894.**

DISTRICT.	Built by the City, by Con- tract or Day Labor.	Built by Private Parties.	Total Length built during the 12 Months ending Jan. 31, 1894.
	Feet.	Feet.	Feet.
City	1,501.20		1,501.20
Charlestown	2,333.70		2,333.70
East Boston	2,394.88		2,394.88
Brighton	12,272 87	2,621.07	14,893.94
South Boston	694.60	475.00	1,169.60
Dorchester	12,750.15	8,606.22	21,356.37
Roxbury	22,117.76	3,027.82	25,145.58
West Roxbury	12,335.69	8,106.98	20,442.67
<hr/>			
Total	66,400.85	22,837.09	89,237.94

183 catch-basins built.

283 " repaired.

35 manholes built.

192 " repaired.

958,775 lineal feet of sewers flushed.

1,813.86 cu. yds. of material removed from sewers.

6,891 catch-basins cleaned.

21,806.21 cu. yds. of material removed from catch-basins.

1,616.7 feet of culverts built.

60 " " " repaired.

There are now 365.58 miles of sewers in charge of the Sewer Division.

The amount expended by this division during the twelve months ending January 31, 1894, including the amount spent under special appropriations, was \$697,238.78.

The items of expenditure are shown in the financial statement.

Schedule of Sewers built to Date in the City of Boston.

Wards.	Feet.	Wards.	Feet.	
1.....	81,467	14.....	75,582	
2.	42,828	15.....	47,504	
3.....	31,719	16.....	31,626	
4.....	42,102	17.....	42,765	
5.....	40,018	18.....	59,573	
6.....	45,434	19.	47,304	
7.....	36,779	20.....	103,477	
8.....	18,532	21.....*	130,413	
9.....	27,247	22.....	113,798	
10.....	38,382	23.....	173,743	
11.	74,880	24.....	294,385	
12.....	42,006	25.....	117,403	
13.....	52,654			
			1,811,620	or 343.1 miles.
Intercepting sewers				22.48 "
Total				365.58 miles.

**Fall of Rain and Snow in Inches at South Yard, Albany
Street, in twelve months ending January 31, 1894.**

DAY.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.
1.....	....	.25	....	.23	....	....	....	....	....	....	.40	....
2.....	.24	....	....	....	....	....	....	.35	....	....	....	....
3.....	.27	....	....	....	....	....	....	....	.15	....	1.40	....
4.....	....	.11	.05	3.49	....	....	....	....	....	.83	....	....
5.....	....	....	....	....	....	.17	....	....	....	....	.78	.04
6.....	....	....	.27	....	.09	....	2.48	....	....	....	....	....
7.....	.55	....	.83	....	....	....	2.85	.26	....	....	....	....
8.....	....	....	....	....	....	....	....	....	....	....	....	....
9.....	....	....	....	....	....	....	....	....	....	....	.37	....
10.....	.90	1.30	....	....	....	....	....	....	....	....	....	.02
11.....	....	....	....	....	....	....	....	....	....	....	....	.01
12.....	....	.20	....	....	.05	....	....	....	....	....	.01	....
13.....	....	....	....	....	....	.03	....	....	....	....	....	....
14.....	1.48	....	....	.43	.31	....	....	....	1.07	....	....	....
15.....	....	.79	.85	....	....	....	....	....	....	.19	1.61	.33
16.....	....	....	....	....	.08	....	....	.59	....	....	....	....
17.....	....	....	....	1.47	.23	....	.09	....	....	....	....	....
18.....	1.	....	....	.05	....	.55	....	....	....	....	....	....
19.....	....	....	....	....	....	....	....	.19	....	....	.07	.15
20.....	.08	....	....	....	....	....	....	....	....	....	....	....
21.....	....	.03	1.02	....	....	....	1.71	....	....	.67	....	....
22.....	1.52	....	.08	....	....	.76	....	....	....	....	....	....
23.....	....	....	....	....	1.59	.16	....	.03	....	....	.01	....
24.....	....	.16	....	.02	....	.21	.20	....	2.06	....	....	.68
25.....	....	....	....	....	....	....	....	.09	....	....	....	....
26.....	....	....	.12	....	....	.20	....	....	....	....	....	.90
27.....	....	....	.09	....	....	....	....	....	....	....	....	....
28.....	....	....	....	.63	....	....	....	....	.23	.52	....	....
29.....	....	....	....	....	....	....	.26	....	....	....	.25	1.15
30.....	....	....	....	....	....	....	....	.04	....	....	.24	....
31.....	....	....	....	....	....	....	....	....	....	....	....	....
Totals	6.04	2.84	3.31	6.32	2.35	2.08	7.59	1.55	3.51	2.21	5.14	3.28

Total for twelve months, 46.22 inches.

Sewer Department, Pumping-Station.
Report of Pumping done from February 1, 1893, to January 31, 1894.

	ENGINE 1.		ENGINE 2.		ENGINE 3.		ENGINE 4.		Total gallons pumped.	Daily average gallons pumped.	Daily average pounds coal used.	Per cent. of ashes and clinkers.	Gallons pumped per pound of coal used.	Daily average lift in feet.	Daily average duty in ft.-lbs. per 100 lbs. coal used.
	Pumping time.	Gallons pumped.	Pumping time.	Gallons pumped.	Pumping time.	Gallons pumped.	Pumping time.	Gallons pumped.							
1893.	<i>H. M.</i>		<i>H. M.</i>		<i>H. M.</i>		<i>H. M.</i>								
February	100 35	228,172,521	219 20	307,817,911	660 55	935,665,848	637 20	891,758,448	2,363,414,728	84,407,669	30,343	8.8	2,782 35.56	82,786,345	
March	284 50	392,987,655	373 20	522,064,575	738 05	1,054,165,068	730 27	1,011,568,968	2,980,786,266	96,154,395	37,180	8.3	2,586 35.84	77,571,354	
April	96 30	135,909,785	93 05	182,751,509	707 20	1,006,924,284	691 40	977,815,260	2,252,500,838	75,083,361	25,640	9.5	2,928 35.40	86,756,598	
May	113 40	157,200,580	254 10	366,426,056	731 40	1,061,895,816	727 25	1,048,449,492	2,633,971,944	84,966,837	29,592 10.8		2,871 35.29	84,800,880	
June . . . . .	. . . . .	. . . . .	68 30	98,119,478	710 55	941,851,800	646 56	862,048,620	1,902,019,898	63,400,663	21,148 12.		2,998 35.70	89,570,765	
July	35 20	45,726,730	123	173,552,951	721 20	980,322,804	569 28	748,285,308	1,947,887,793	62,833,090	21,027 12.5		2,988 34.98	87,481,919	
August	31 40	40,061,797	125 05	180,060,004	722 57	971,663,148	732 32	999,127,692	2,190,912,641	70,674,601	23,148 12.2		3,053 35.36	90,351,572	
September . . . . .	. . . . .	. . . . .	30 40	43,490,710	654 08	835,597,584	709 23	922,057,092	1,801,145,386	60,038,177	18,860 12.4		3,183 36.17	96,362,461	
October	228 40	321,877,769	289 10	403,558,169	685 10	956,247,252	301	399,125,880	2,083,809,070	67,219,647	25,436 10.		2,642 34.81	76,979,269	
November . . . . .	. . . . .	. . . . .	53 10	75,359,901	686 35	907,016,904	613 20	811,818,216	1,794,195,021	59,806,500	20,908 11.8		2,860 35.66	85,367,154	
December	30	698,920	260 15	371,423,599	735 55	1,051,496,784	712 06	1,005,474,384	2,429,093,637	78,357,861	28,733 10.		2,727 35.25	80,451,526	
1894.															
January	7 10	9,285,656	90 15	127,338,815	738 25	1,056,857,040	716 45	1,009,927,738	2,203,409,239	71,077,717	25,916 11.7		2,743 36.13	83,923,114	
	958 55	1,331,921,413	1,980 00	2,801,963,678	8,493 25	11,761,804,332	7,798 16	10,687,467,088	26,583,146,511	72,835,209	25,661 10.8		2,863 35.51	85,117,413	

The following table shows the amounts of sludge received in, and removed from, deposit sewers each month from February 1, 1893, to January 31, 1894 :

Month.	Received.	Removed.
February	319 cubic yards.	397.61 cubic yards.
March	276 " "	320 " "
April	407 " "	479.34 " "
May	679 " "	319 " "
June	134 " "	399.45 " "
July	740 " "	477.49 " "
August	606 " "	796 " "
September	141 " "	638 " "
October	772 " "	639 " "
November	854 " "	479 " "
December	161 " "	400 " "
January, 1894	553 " "	559 " "
	<hr/> 5,642	<hr/> 5,903.89

PROPERTY IN CHARGE OF THE SEWER DIVISION.

Sewer yard, with buildings, at 678 Albany street.

Sewer yard, with building, on North Grove street.

Sewer yard, on Gibson street, Dorchester, with buildings. This is Gibson School-fund land. The buildings were erected by the Sewer Department.

Sewer yard, with shed, on Boylston street, Jamaica Plain.

Small lot of land on Stony brook, corner of Centre street, Ward 21.

Gatehouse on Stony brook, Pynchon street, built in 1889.

Sewer yard, with buildings, on Rutherford avenue, Charlestown.

Sewer yard, with buildings, corner Paris and Marion streets.

Sewer yard, with buildings, on East Chester park, near Albany street.

A small shed on Cypress street, Ward 9, on land hired by the city.

Sewer yard, with buildings, on Western avenue, Ward 25.

Summary of Sewer Construction for Six Years.

	1888.	1889.	1890.	1891.	1892.	1893.
	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
Built by city, by contract or day labor....	34,633.81	30,003.03	24,200.25	59,250.18	71,318.46	66,400.85
Built by private parties	14,368.47	13,191.45	17,218.10	20,714.24	22,566.73	22,837.09
Total number of feet built.....	49,002.28	43,194.48	41,418.35	79,964.42	93,885.19	89,237.94

West Roxbury Trunk Sewer.

Labor	\$17,184 44
339,000 bricks	4,068 00
1,075 bbls. cement	1,229 80
217 double loads sand	255 96
40 double loads gravel	43 20
11 manhole frames and covers }	134 12
5 lamphole frames and covers }	
50 lbs. powder }	19 74
Fuse }	
Caps }	
Teaming	232 00
15,569 feet lumber (B.M.)	255 32
Pipe	94 77
47 tons coal	303 97
Centres, etc.	116 62
24 manhole steps	13 20
Miscellaneous supplies	157 57
Tools, blacksmithing, and hardware	668 40
Hire of trench machine	1,200 00
Hire of engine	782 50
	<hr/>
	\$26,759 61

Size and Length of Sewer.

455.25 feet of 28 in. × 42 in., brick.

2,297.55 feet of 24 in. × 36 in., brick.

The cost of this sewer and the amount of work done is a continuation of the cost and work done in 1892.

Sewer in Norfolk Avenue, between Clapp and Magazine Streets.

Labor	\$12,885 59
230,050 bricks	2,250 50
605 bbls. cement	767 20
147 double loads sand	264 60
47 double loads gravel	77 55
6 manhole frames and covers	58 40
37 manhole steps	20 35
Teaming	1,055 00
21,325 feet lumber	341 20
Pipe	216 06
50½ tons coal	269 93
Blacksmithing and hardware	259 71
Centres, etc.	194 52
Rent of land for storage	24 00
Pile-driving	150 80
8 double loads stone	24 00
Miscellaneous supplies	130 40
Hire of trench machine	871 29
Hire of engine	357 50
	<hr/>
	\$20,218 60

*Size and Length of Sewer.*603 feet of 2 ft. 8 in. \times 4 ft., brick.676.88 feet of 2 ft. 6 in. \times 3 ft., brick.

31.61 feet of 15-in., pipe.

Vila Street.

Labor	\$7,318 15
265,225 bricks	2,910 48
1,138 $\frac{1}{4}$ bbls. cement	1,305 32
205 $\frac{1}{2}$ double loads sand	410 84
1,145 $\frac{1}{2}$ double loads gravel	2,005 87
6 manhole frames and covers	77 25
72 manhole steps	39 60
Teaming	1,072 50
41,262 feet (B.M.) lumber	663 03
Pipe	210 88
Centres, etc.	356 94
Blacksmithing	25 45
1 $\frac{1}{2}$ tons salt hay	25 00
1 $\frac{1}{2}$ tons coal	8 18
Miscellaneous	29 40
Roadway	802 00
Pile-driving	1,302 08
Regulator castings	369 75
	<hr/>
	\$18,932 72

Size and Length of Sewer.

42.79 feet of 2-ft., circular brick.

1437.47 feet of 3 ft. 3 in. \times 3 ft. 5 $\frac{1}{4}$ in., brick.27.20 feet of 30 in. \times 36 in., brick.

24.17 feet of sump and regulator.

The cost of this sewer and the amount of work done is a continuation of the cost and work done during the year 1892.

Dorchester Lower Mills Trunk Sewer.

Labor	\$12,053 31
335,000 bricks	3,663 50
821 bbls. cement	929 19
218 $\frac{1}{2}$ double loads sand	393 30
20 double loads gravel and filling	31 80
11 manhole frames and covers	88 70
1 lamphole frame and cover	7 20
200 lbs. powder } Fuse } Caps }	88 74
Teaming	585 00
12,969 feet (B.M.) lumber	297 51
Pipe	163 09

Carried forward,

\$18,211 34

<i>Brought forward,</i>	\$18,211 34
15 tons coal	79 04
69 manhole steps	37 95
Miscellaneous supplies	5 72
	<hr/>
	\$18,334. 05

*Size and Length of Sewer.*1,738 feet of 30 in. \times 36 in., brick.255 feet of 24 in. \times 36 in., brick.

The cost of this sewer and amount of work done is a continuation of the cost and work done during the year 1892.

Commonwealth Avenue, No. 1.

Labor	\$9,339 17
154,050 bricks	1,694 55
421 bbls. cement	471 52
15 double loads gravel and screenings	26 25
21 manhole frames and covers	178 05
12 manhole steps	6 60
250 lbs. powder }	97 17
Fuse }	
Caps	
Teaming	806 00
31,638 ft. lumber	520 03
Pipe	1,647 43
Hire of trench machine	633 66
Hire of engine	360 00
Centres, etc.	63 24
Blacksmithing	244 02
56 tons coal	288 30
Miscellaneous supplies	61 47
	<hr/>
	\$16,437 46

*Size and Length of Sewer.*872.12 linear feet 2 ft. 4 in. \times 3 ft. 6 in., brick.

348.20 linear feet 24-in., pipe.

269.05 linear feet 18-in., pipe.

1,432.93 linear feet 15-in., pipe.

Bay State Road.

D. O'Connell, contractor	\$8,238 12
132,250 bricks	1,452 75
395 bbls. cement	446 92
10 manhole frames and covers	76 65
15 manhole steps	8 25
Teaming	14 25
Pipe	1,153 31
2 catch-basin frames and grates	20 00
Inspection	323 75
	<hr/>
	\$11,734 00

*Size and Length of Sewer.*595.37 feet of 2 ft. 6-in. \times 3 ft., brick.

699.44 feet of 18-in., pipe.

165.53 feet of 15-in., pipe.

1,024.59 feet of 12-in., pipe.

165 feet of 10-in., pipe.

2,309.5 feet of 6-in., pipe.

7 catch-basins.

7 drop inlets.

Norfolk Avenue, Oak to Clapp Streets.

Labor	\$4,737 48
172,850 bricks	1,728 50
528 bbls. cement	620 64
97 double loads sand	174 60
4 double loads gravel	6 00
2 manhole frames }	28 35
3 manhole covers }	
Teaming	837 75
14,230 feet lumber	230 93
Pipe	153 86
Centres, etc.	451 68
15 perch stone	26 25
25 manhole steps	13 75
Rent of land	48 00
46 tons coal	250 30
Tools and blacksmithing	121 04
Miscellaneous supplies	69 29
Hire of trench machine	600 00
Hire of engine	257 50
	<hr/>
	\$10,355 92

*Size and Length of Sewer.*102.09 feet, 8 ft. \times 8 ft. 6 in., brick.

The cost of this sewer and the amount of work done is a continuation of the cost and work done in 1892.

Sewer and Culvert in Rockwell and Armandine Streets.

Collins & Ham, contractors	\$6,075 71
70,450 bricks	714 30
481½ bbls. cement	556 65
6 manhole frames and covers	62 50
Pipe	794 73
6 manhole steps	3 30
2 stone frames	30 00
2 iron grates	18 22
8,620 lbs. granite	19 40
Inspection	850 50
	<hr/>
	\$9,125 31

*Size and Length of Sewer.*395.48 feet 24 in. \times 36 in., brick.

513.20 feet 15-in., pipe.

1,309.38 feet 12-in., pipe.

The cost of this sewer and the amount of work done is a continuation of the cost and work done during the year 1892.

Batavia Street, between St. Stephen and Parker Streets.

S. Connelly, contractor	\$3,374 11
66,510 bricks	692 60
270 $\frac{1}{2}$ bbls. cement	308 54
$\frac{1}{12}$ double load of sand	16
4 manhole frames and covers	34 75
Teaming	6 00
Pipe	173 27
Centres, etc.	124 50
Inspection	313 11
	<hr/>
	<u>\$5,027 04</u>

*Size and Length of Sewer.*501.86 feet of 2 ft. 6 in. \times 3 ft., brick.

68.4 feet of 10-in , pipe.

520 feet of 6-in., pipe.

Shirley Street, between Norfolk Avenue and George Street.

Labor	\$3,824 80
215,000 bricks	262 50
68 bbls. cement	76 16
25 double loads sand	45 00
12 manhole steps	6 60
2 manhole frames and covers	15 40
Teaming	318 00
4,136 feet lumber	66 45
Pipe	16 27
Blacksmithing and tools	23 35
Miscellaneous supplies	8 52
	<hr/>
	<u>\$4,663 05</u>

*Size and Length of Sewer.*473 feet 2 ft. 6 in. \times 3 ft., brick.

Cary Street, between Ruggles and Terry Streets.

Labor	\$3,243 01
10,500 bricks	105 00
	<hr/>
Carried forward,	\$3,348 01

<i>Brought forward,</i>	\$3,348 01
79 bbls. cement	87 72
10 double loads sand	18 53
100 double loads gravel	170 00
4 manhole frames and covers	38 90
41 manhole steps	22 55
Teaming	366 00
8.851 feet lumber	141 62
Pipe (Akron)	200 42
45 feet (iron) pipe	45 00
Centres and templates	64 15
Blacksmithing	39 28
Miscellaneous supplies	6 22
	<hr/>
	<u>\$4,548 40</u>

Size and Length of Sewer.

645.22 feet 12-in., pipe.

**Longwood Avenue, between Brookline Avenue and
Wigglesworth Street.**

Labor	\$2,553 68
11,700 bricks	122 75
39 bbls. cement	43 68
3½ double loads sand	7 00
7½ double loads gravel	127 75
7 manhole frames and covers	70 15
1 lamphole frame and cover	7 20
Teaming	618 00
Pipe	857 25
Blacksmithing	50 90
	<hr/>
	<u>\$4,458 36</u>

Size and Length of Sewer.

212.22 feet 24-in., pipe.

835.99 feet 15-in., pipe.

651.47 feet 12-in., pipe.

Alford Street, Charlestown.

Labor	\$2,650 82
11,337 bricks	99 10
34½ bbls. cement	37 95
10¾ single loads sand	10 75
30 double loads gravel	60 00
5 manholes and covers	42 60
Teaming	176 50
3,512 feet lumber	57 60

Carried forward,\$3,135 32

<i>Brought forward,</i>	\$3,135 32
Pipe	427 44
Hire of trench machine	234 98
Hire of engine	157 50
10½ tons coal	54 60
Miscellaneous supplies	9 07
	<hr/>
	<u>\$4,018 91</u>

Size and Length of Sewer.

609.85 feet of 12-in., pipe.

560.15 feet of 15-in., pipe.

Adams Street, between Linden and Bowdoin Streets.

Labor	\$2,517 31
10,200 bricks	104 10
29 bbls. cement	33 80
15 single loads sand	13 50
3 manhole frames and covers	35 40
575 lbs. powder }	224 67
Fuse }	
Caps }	
Teaming	121 50
Pipe	436 13
Blasting logs	130 00
3 tons coal	16 35
Miscellaneous supplies	4 02
	<hr/>
	<u>\$3,636 78</u>

Size and Length of Sewer.

470.65 feet of 12-in., pipe.

The cost of this sewer and the amount of work done is a continuation of the cost and work done during the year 1892.

Commonwealth Avenue, No. 2.

Labor	\$2,386 90
9,000 bricks	99 00
10 bbls. cement	11 20
6 double loads sand	11 70
3 manhole frames and covers	23 10
Teaming	85 50
1,002 feet lumber	16 41
Pipe	791 58
1½ tons coal	7 80
Blacksmithing	6 45
Miscellaneous supplies	4 80
	<hr/>
	<u>\$3,444 44</u>

Size and Length of Sewer.

960.30 feet of 18-in , pipe.

671.65 feet of 15-in., pipe.

828.05 feet of 12-in., pipe.

**Deerfield Street, between Commonwealth Avenue and
Charles River.**

D. O'Connell, contractor	\$2,621	71
30 bbls. cement	.	.	.	.	.	33	60
Teaming	.	.	.	.	.	1	50
Pipe	.	.	.	.	.	577	08
Inspection	.	.	.	.	.	57	75
							<hr/>
							\$3,291 64
							<hr/>

Size and Length of Sewer.

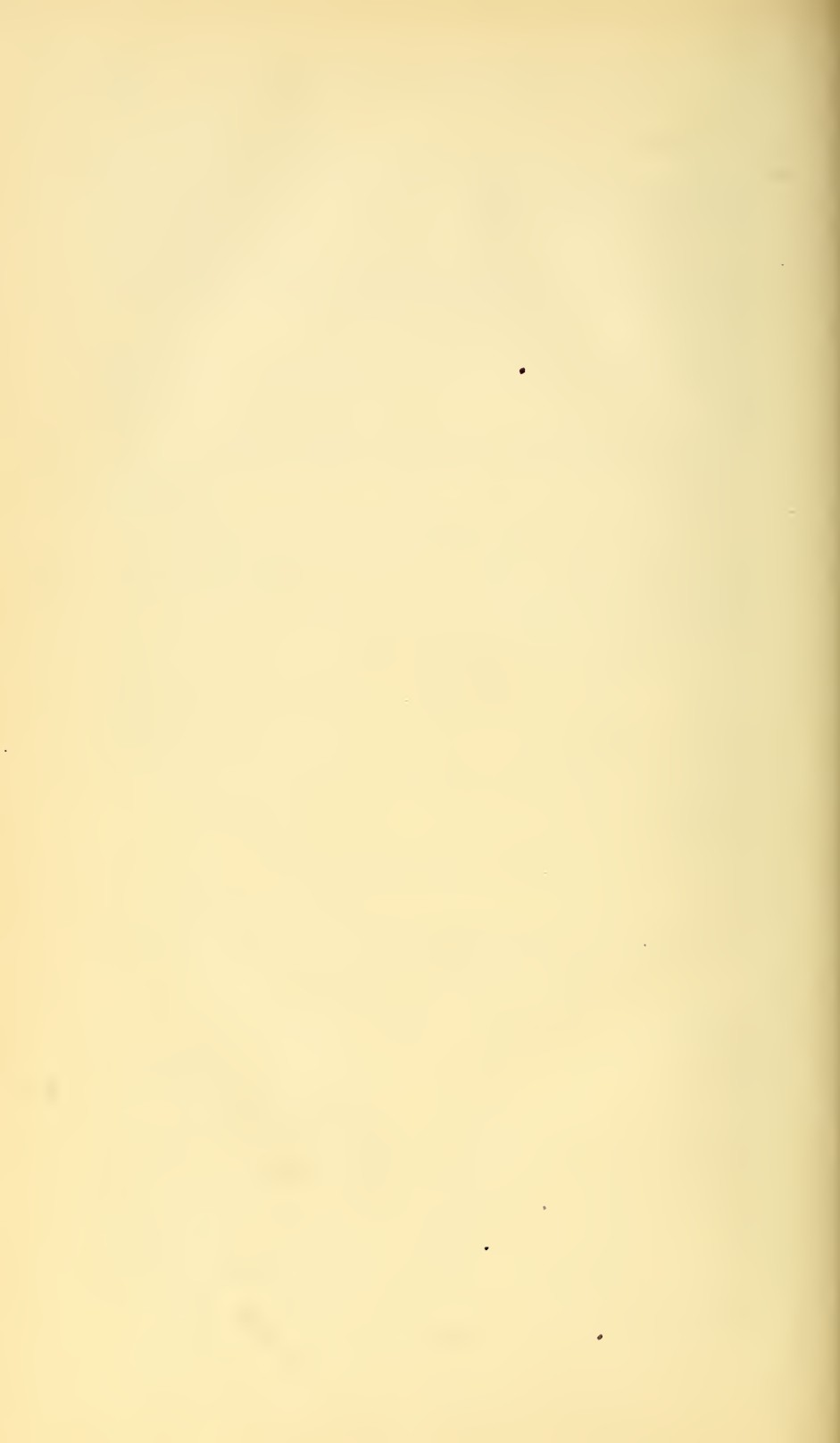
752.13 feet of 18-in. pipe.

249.96 feet of 12-in., pipe.

42 feet of 10-in., pipe.

39.5 feet of 6-in., pipe.

2 catch-basins.



APPENDIX E.

REPORT OF THE DEPUTY SUPERINTENDENT OF THE
STREET-CLEANING DIVISION.STREET DEPARTMENT, STREET-CLEANING DIVISION,
14 BEACON ST., BOSTON, February 1, 1894.H. H. CARTER, ESQ., *Superintendent of Streets, Boston:*

DEAR SIR: I respectfully submit my annual report of the expenditures, business and income of the Street-Cleaning Division of the Street Department for the financial year, ending January 31, 1894:

FINANCIAL STATEMENT.

Amount of appropriation	\$290,000 00
Revenue from Brookline Gas Light Company on account of work done by this division	154 50
Transfer from Paving Division	15,000 00
Transfer from Sewer Division	3,552 80
Total	<u>\$308,707 30</u>
Total amount of expenditures	<u>\$308,707 30</u>

OBJECTS OF EXPENDITURE.

Superintendence.

Salary of Deputy Superintendent	\$3,000 00
Office pay-rolls	4,668 02
Stationery	185 11
Printing	440 61
Board of horses	575 00
Telephone service	244 72
Total cost of superintendence	<u>\$9,113 46</u>

CLEANING STREETS.

Including the Cost of Sweeping, Loading and Removal of Street-dirt.

District 1.	West End	\$17,029 12
District 2.	North End	20,711 74
District 3.	South End	21,461 08
District 4.	South End	17,992 67
District 5.	Back Bay	13,183 81
District 6.	South Boston	13,855 96
District 7.	Roxbury	14,607 46
District 8.	Brighton. ¹	
District 9.	Charlestown and East Boston . . .	11,297 03
Total cost of cleaning streets		<u>\$130,138 87</u>

CLEANING GUTTERS.

Including Cost of Sweeping, Loading and Removal of Street-dirt.

District 1.	West End	\$2,151 56
District 2.	North End	District entirely paved.
District 3.	South End	
District 4.	South End	2,440 61
District 5.	Back Bay	6,334 68
District 6.	South Boston	5,627 19
District 7.	Roxbury	5,652 04
District 8.	Brighton. (See "Cost of Scraping.")	
District 9.	Charlestown and East Boston . . .	3,646 24
Total cost of cleaning gutters		<u>\$25,852 32</u>

Total length of gutters cleaned, 2,047.17 miles.

Average cost per mile, \$12.91.

CLEANING CROSSINGS.

Including Cost of Manual and Machine Labor.

Cost of cleaning crossings	\$1,160 56
Removing snow by patrol	3,308 43
Total cost	<u>\$4,468 99</u>

COST OF MAINTAINING DUMPS.

District 1.	West End	\$584 08
District 2.	North End	497 15
District 3.	South End	527 95
District 4.	South End	517 40
District 5.	Back Bay	575 40
District 6.	South Boston	548 00
District 7.	Roxbury . . . . .	. . .
District 8.	Brighton . . . . .	. . .
District 9.	Charlestown and East Boston . . .	466 02
Total cost of dumps		<u>\$3,716 00</u>

¹ See "Scraping."

STREET DEPARTMENT—STREET-CLEANING DIVISION. 333

SNOW.

Including Labor on Crossings, in Streets, Carting of Snow, etc.

District 1.	West End	.	.	.	.	.	.	\$3,931	85
District 2.	North End	.	.	.	.	.	.	4,023	19
District 3.	South End	.	.	.	.	.	.	3,288	62
District 4.	South End	.	.	.	.	.	.	3,654	75
District 5.	Back Bay	.	.	.	.	.	.	4,426	56
District 6.	South Boston	.	.	.	.	.	.	4,207	68
District 7.	Roxbury	.	.	.	.	.	.	5,062	31
District 8.	Brighton	.	.	.	.	.	.	390	00
District 9.	Charlestown and East Boston	.	.	.	.	.	.	3,255	49
Charged by Sanitary Division		.	.	.	.	.	.	168	25
Total cost								\$32,408	70

COST OF SCRAPING.

Macadamized or Gravelled Streets.

District 8. Brighton \$2,422 34

This shows the cost of scraping with hoes the entire street from curb to curb.

Total length of miles scraped, 36.01.

Cost of scraping per mile, \$67.26.

MISCELLANEOUS WORK.

This shows the cost of such work as may not be characterized the same in all districts.

Including miscellaneous work, sweeping and carting of leaves, etc. :

District 1.	West End	.	.	.	.	.	.	\$4 73
District 2.	North End	.	.	.	.	.	.	26 95
District 3.	South End	.	.	.	.	.	.	23 75
District 4.	South End	.	.	.	.	.	.	75 24
District 5.	Back Bay	.	.	.	.	.	.	1,424 49
District 6.	South Boston	.	.	.	.	.	.	432 60
District 7.	Roxbury	.	.	.	.	.	.	403 41
District 8.	Brighton	.	.	.	.	.	.	1,635 16
District 9.	Charlestown and East Boston	.	.	.	.	.	.	23 81
Total cost								<u>\$4,050 14</u>

PATROL SYSTEM.

Superintendence	\$1,196	52
Push-carts, including labor and teaming	22,900	42
Total cost	\$24,096	94

Recapitulation of Expenses, exclusive of Superintendence, Stable and Yard Expenses, Stock and Miscellaneous Accounts.

Districts.	Cost of cleaning streets.	Cost of cleaning gutters.	Cost of cleaning crossings.	Cost of dumps.	Cost of snow.	Cost of scraping.	Miscellaneous work.	Cost of patrol system.	Total.
1....	\$17,029 12	\$2,151 56	.....	\$584 08	\$3,931 85	.....	\$4 73	.....	\$23,701 34
2....	20,711 74	.....	.....	497 15	4,023 19	.....	26 95	.....	25,259 03
3....	21,461 08	.....	.....	527 95	3,288 62	.....	23 75	.....	25,301 40
4....	17,992 67	2,440 61	.....	517 40	3,654 75	.....	75 24	.....	24,680 67
5....	13,183 81	6,334 68	.....	575 40	4,426 56	.....	1,424 49	.....	25,944 94
6....	13,855 96	5,627 19	.....	548 00	4,207 68	.....	432 60	.....	24,671 43
7....	14,607 46	5,652 04	.....	.....	5,062 31	.....	403 41	.....	25,725 22
8....	.....	.....	.....	.....	390 00	\$2,422 34	1,635 16	.....	4,447 50
9....	11,297 03	3,646 24	.....	466 02	3,255 49	.....	23 81	.....	18,688 59
Cost of Sweeping Crossings .....	.....	.....	.....	.....	.....	.....	.....	.....	4,468 99
Paid to Sanitary Division.....	.....	.....	.....	.....	.....	.....	.....	.....	168 25
Patrol System .....	.....	.....	.....	.....	168 25	.....	.....	\$24,096 94	24,096 94
Total.....	\$130,138 87	\$25,852 32	\$4,468 99	\$3,716 00	\$23,408 70	\$2,422 34	\$4,050 14	\$24,096 49	\$227,154 30

STABLE AND YARD EXPENSES.

Including the Cost of the South End, West End, Roxbury, South Boston, and Charlestown Stables, as follows:

Superintendence of stables	\$2,393 04
Labor, including the cost of feeders, hostlers, broom-makers, blacksmiths, carpenters, watchmen, yardmen, etc.	18,414 27
Cart and carriage repairs	3,355 00
Harness repairs	420 63
Horse-shoeing	3,001 44
Sweeping-machine repairs	839 31
Stable and shed repairs	1,830 86
Street-car tickets and ferry passes	1,160 00
Tool repairs	25 35
Veterinary services and medicine	604 30
Total	<u>\$32,044 20</u>

STOCK ACCOUNT.

Broom stock purchased	\$7,050 06
Carts and carriages purchased	1,225 00
Harnesses and horse furnishings purchased	1,379 90
Horses purchased. (Net)	3,170 00
Sleighs purchased	190 00
Sweeping-machines purchased	2,175 00
Tools purchased	498 02
Waste barrels purchased	524 00
Patrol stock and maintenance of same	2,462 32
Total	<u>\$18,674 30</u>

MISCELLANEOUS.

Building new shed, in Roxbury	\$1,691 97
Building shed, at West End	338 50
Holidays	11,340 21
Scow (cost of disposal at sea of 33,699 loads of street-dirt)	7,723 30
Sundries	919 56
Total	<u>\$22,013 54</u>

GENERAL RECAPITULATION OF EXPENSES.

Superintendence	\$9,113 46
Cleaning streets	130,138 87
Cleaning gutters	25,852 32
Cleaning crossings	4,468 99
Maintaining dumps	3,716 00
Removal of snow and ice	32,408 70
Scraping macadamized streets	2,422 34
Miscellaneous work	4,050 14
Patrol system	24,096 94
Stable and yard expenses	32,044 20
Stock account	18,674 30
Miscellaneous	22,013 54
Total	<u>\$308,999 80</u>

NOTE.—Of the above amount, the sum of \$292.50 was paid by other departments, on account of work done, etc., making the net expenses of this division, as shown in financial statement, \$308,707.30.

Table showing the Cost per Mile of Cleaning the Streets in each District, exclusive of Supervision and other Expenses.

DISTRICTS.	Miles of Streets Cleaned.	Cost of Cleaning.	Pro Rata Cost of Dumps.	Total Cost.	Cost per Mile.
No. 1.	1,442.57	\$17,029 12	\$519 83	\$17,548 95	\$12 16
No. 2.	1,797.73	20,711 74	497 15	21,208 89	11 79
No. 3.	1,867.93	21,461 08	527 95	21,989 03	11 77
No. 4.	1,726.66	17,992 67	460 49	18,453 16	10 68
No. 5.	643.93	13,183 81	385 50	13,569 31	21 07
No. 6.	843.31	13,855 96	389 08	14,245 04	16 89
No. 7.	502.23	14,607 46	.....	14,607 46	29 08
No. 8. ....	.....	.....	.....	.....	.....
No. 9.	696.52	11,297 03	349 51	11,646 54	16 72
	9,520.88	\$130,138 87	\$3,129 51	\$133,268 38	

Average cost per mile of cleaning streets in eight districts, exclusive of supervision, etc., \$13.99.

STREET DEPARTMENT — STREET-CLEANING DIVISION. 337

Table showing the Cost per Mile of Cleaning Streets in each District, including Supervision, Labor, Yard and Stable Expenses.

DISTRICTS.	Miles of Streets Cleaned.	Cost of Cleaning Streets.	58% of the Total Cost of Supervision.	66% of the Total Cost of Yard and Stable Expenses.	Total Expense.	Total Cost per Mile.
No. 1....	1,442.57	\$17,548 95	\$696 04	\$2,784 95	\$21,029 94	\$14 57
No. 2 ...	1,797.73	21,208 89	841 20	3,365 77	25,415 86	14 13
No. 3....	1,867.93	21,989 03	872 14	3,489 57	26,350 74	14 10
No. 4....	1,726.66	18,453 16	731 90	2,928 44	22,113 50	12 80
No. 5....	643.93	13,569 31	538 20	2,153 39	16,260 90	25 25
No. 6....	843.31	14,245 04	565 00	2,260 64	17,070 68	20 24
No. 7....	502.23	14,607 46	579 38	2,318 15	17,504 99	34 85
No. 8....						
No. 9....	696.52	11,646 54	461 94	1,848 26	13,956 74	20 03
	9,520.88	\$133,268 38	\$5,285 80	\$21,149 17	\$159,703 35	

Average cost per mile of cleaning streets in eight districts, including supervision, etc., \$16.77.

Table showing the Number of Loads of Street-dirt removed.

DISTRICTS.	Number of Loads of Dirt removed.	Cost per Load of cleaning streets, and removing to dumps, including Foreman's Superintendence.
1.....	10,063	\$1.90
2.....	11,103	1.86
3.....	11,688	1.83
4.....	11,534	1.77
5.....	15,541	1.32
6.....	12,542	1.63
7.....	17,322	1.16
8.....	5,758	....
9.....	11,028	1.35
Patrol system	106,579 3,917	equal to 50,629 barrel loads.
Total cart-loads.....	110,496	

33,699 loads of the above (or about 30 per cent.) were delivered at the dumping scow, the towing of which to sea cost 22 cents per load. In addition to the above, 39,151 single loads and 305 double loads of street scrapings were removed from the streets by the Paving Division.

¹ Includes loads from Miscellaneous Work.

PUBLIC WASTE BARRELS.

Total number of waste barrels emptied (about five months' work)	4,410
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INCOME.

Amount of bills deposited with the City Collector during the financial year ending January 31, 1894 .	\$6,049 82
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COMPLAINTS.

Through Central Office	2
By letter	1
Total number of complaints	<u>3</u>

AVERAGE FORCE EMPLOYED JANUARY 31, 1894.

Deputy Superintendent	1
Clerk	1
Messengers	2
Employees	309

Entire force	<u>313</u>
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Respectfully submitted,

PHILIP A. JACKSON,
Deputy Superintendent.

APPENDIX F.

FORMER SUPERINTENDENTS AND DOCUMENT
NUMBERS OF ANNUAL REPORTS.**Bridge Department before 1891.***Previous to 1886 under charge of City Engineer.*

NAME.	Year.
Bartholomew M. Young	1886 to 1889
James H. Nugent	1889 to 1891

NAME OF DOCUMENT.	For Year.	Pub. Year.	No. of Doc.
Annual Report	1886	1887	29
“ “	1887	1888	26
“ “	1888	1889	29
“ “	1889	1890	22
“ “	1890	1891	*

*Published in Annual Report, Executive Department, Part I., City Document No. 1, 1891.

Paving Department before 1891.

NAME.	Year.
Enoch Patterson, Supt. Streets and Drains	1827 to 1831
Zephaniah Sampson, “ “ “ “	1831 to 1846
Thomas Hunting, Superintendent	1846 to 1853
Alfred T. Turner, “	1853 to 1864
Charles Harris, “	1864 to 1883
Nehemiah T. Merritt, “	1883
James J. Flynn, “	1883
Charles Harris, “	1884
Michael Meehan, “	1884 to 1886
John W. McDonald, “	1886 to 1889
J. Edwin Jones, “	1889 to 1891

Paving Department before 1891.

NAME OF DOCUMENT.	For Year.	Pub. Year.	No. of Doc.
Quarterly Report.....		1851	6
“ “.....		1851	29
Annual Report ..	1851	1852	2
“ “.....	1852	1853	6
“ “.....	1853	1854	6
“ “.....	1854	1855	5
“ “.....	1855	1856	3
“ “.....	1856	1857	3
“ “.....	1857	1858	3
“ “.....	1858	1859	5
“ “.....	1859	1860	6
“ “.....	1860	1861	5
“ “.....	1861	1862	4
“ “.....	1862	1863	3
“ “.....	1863	1864	3
“ “.....	1864	1865	70
“ “.....	1865	1866	3
“ “.....	1866	1867	6
“ “.....	1867	1868	9
“ “.....	1868	1869	14
“ “.....	1869	1870	13
“ “.....	1870	1871	12
“ “.....	1871	1872	16
“ “.....	1872	1873	21
“ “.....	1873	1874	25
“ “.....	1874	1875	27
“ “.....	1875	1876	30
“ “.....	1876	1877	38
“ “.....	1877	1878	29
“ “.....	1878	1879	24
“ “.....	1879	1880	24
“ “.....	1880	1881	48
“ “.....	1881	1882	51
“ “.....	1882	1883	47
“ “.....	1883	1884	46
“ “.....	1884	1885	97
“ “.....	1885	1886	30
“ “.....	1886	1887	16
“ “.....	1887	1888	23
“ “.....	1888	1889	30
“ “.....	1889	1890	19
“ “.....	1890	1891	*

* Published in Annual Report, Executive Department, Part II., City Document No. 1, 1891.

Sewer Department before 1891.

NAME.	Year.
Enoch Patterson, Superintendent	1827 to 1831
Zephaniah Sampson, "	1831 to 1837
Charles B. Wells, "	1837 to 1856
Simeon B. Smith, "	1856 to 1863
William H. Bradley, "	1863 to 1883
Horace H. Moses, "	1883 to 1885
Thomas J. Young, "	1885 to 1887
Seth Perkins, "	1887 to 1889
Charles Morton, "	1889 to 1891

Sewer Department before 1891.

NAME OF DOCUMENT.	For Year.	Pub. Year.	No. of Doc.
Annual Report	1855	1860	11
" "	1860	1861	12
" "	1861	1862	12
" "	1862	1863	13
" "	1863	1864	11
" "	1864	1865	5
" "	1865	1866	6
" "	1866	1867	8
" "	1867	1868	13
" "	1868	1869	11
" "	1869	1870	3
" "	1870	1871	11
" "	1871	1872	10
" "	1872	1873	13
" "	1873	1874	12
" "	1874	1875	17
" "	1875	1876	11
" "	1876	1877	13
" "	1877	1878	15
" "	1878	1879	11
" "	1879	1880	16
" "	1880	1881	19
" "	1881	1882	18
" "	1882	1883	16
" "	1883	1884	43
" "	1884	1885	
" "	1885	1886	58
" "	1886	1887	69
" "	1887	1888	81
" "	1888	1889	129
" "	1889	1890	14
" "	1890	1891	*

* Published in Annual Report, Executive Department, Part II., City Document No. 1, 1891.

Health Department before 1891.

Sanitary.

NAME.	Year.
Ezra Forristall, Superintendent	1853 to 1854
Joseph W. Coburn, "	1854 to 1855
Ezra Forristall, "	1855 to 1869
George W. Forristall, "	1869 to 1890

Health Department before 1891.

Sanitary.

NAME OF DOCUMENT.	Year.	Pub. Year.	No. of Doc.
Annual Report	1853	1854	7
" "	1854	1855	6
" "	1855	1856	4
" "	1856	1857	4
" "	1857	1858	4
" "	1858	1859	4
" "	1859	1860	5
" "	1860	1861	6
" "	1861	1862	5
" "	1862	1863	5
" "	1863	1864	4
" "	1864	1865	4
" "	1865	1866	8
" "	1866	1867	7
" "	1867	1868	8
" "	1868	1869	12
" "	1869	1870	4
" "	1870	1871	10
" "	1871	1872	17
" "	1872	1873	40
Annual report from 1873 to 1884 inclusive; the Superintendent's report was embodied in the report of the Board of Health	1885	1886	45
Annual Report	1886	1887	22
" "	1887	1888	16
" "	1888	1889	23
" "	1889	1890	21
" "	1890	1891	*

* Published in Annual Report, Executive Department, Part I., City Document No. 1, 1891.

Commissioners of Cambridge Bridges before 1891.

(West Boston, Canal, and Prison Point.)

NAME.	Year.
Frederic W. Lincoln, Commissioner for Boston	{ May 22, 1871, to March, 1891. June 14, 1871, to Jan. 31, 1883. March 28, 1883, to present time.
Ezra Parmenter, Commissioner for Cambridge	
William J. Marvin, Commissioner for Cambridge	

Harvard Bridge added in 1892.

Commissioners of Cambridge Bridges before 1891.

(West Boston, Canal, and Prison Point.)

NAME OF DOCUMENT.	For Year.	Pub. Year.	No. of Doc.
Annual Report	1871	1872	19
" "	1872	1873	12
" "	1873	1874	16
" "	1874	1875	23
" "	1875	1876	20
" "	1876	1877	12
" "	1877	1878	10
" "	1878	1879	8
" "	1879	1880	12
" "	1880	1881	8
" "	1881	1882	15
" "	1882	1883	15
" "	1883	1884	19
" "	1884	1885	8
" "	1885	1886	12
" "	1886	1887	19
" "	1887	1888	25
" "	1888	1889	22
" "	1889	1890	20
" "	1890	1891	*

*Published in Annual Report, Executive Department, Part I., City Document No. 1, 1891.

Street Department since 1891.*Superintendent.*

Henry H. Carter, Member American Society Civil Engineers.

Executive Engineer.

Henry B. Wood, Member Boston Society Civil Engineers.

PAVING DIVISION. — Charles R. Cutter, *Deputy Superintendent.*
Member Boston Society Civil Engineers.

SEWER DIVISION. — Henry W. Sanborn, *Deputy Superintendent.*
Member Philadelphia Society Civil Engineers.

SANITARY DIVISION. — George W. Forristall,* *Deputy Superintendent.*

SANITARY DIVISION. — Philip A. Jackson, *Acting Deputy Superintendent*
since January 16.

STREET-CLEANING DIVISION. — Philip A. Jackson.

BRIDGE DIVISION. — John A. McLaughlin, *Deputy Superintendent.*

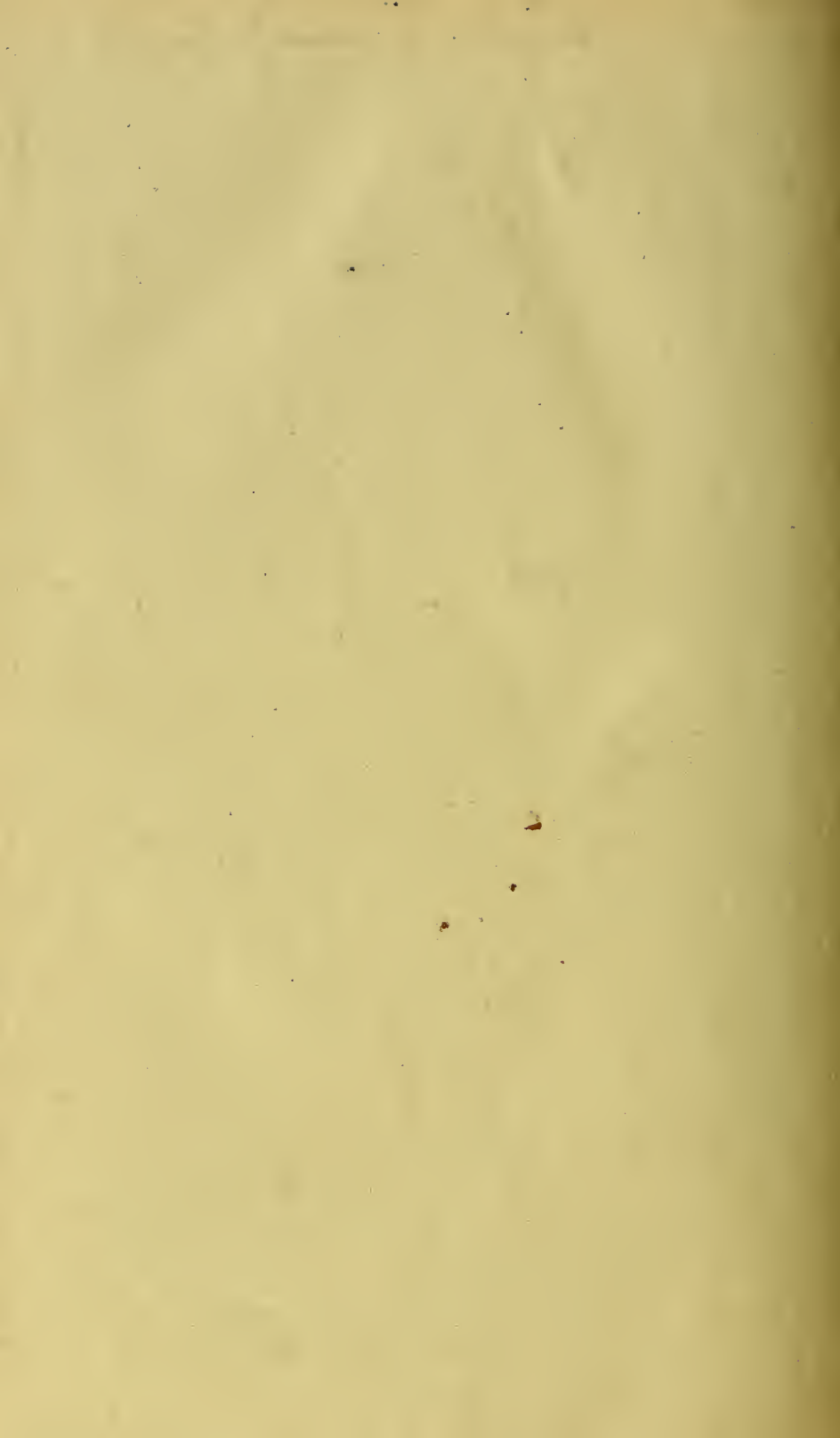
BOSTON AND CAMBRIDGE BRIDGES. — Henry H. Carter, *Ex-Officio, Commissioner for Boston.*

William J. Marvin, *Commissioner for Cambridge.*

* Died January 12, 1894.

Street Department.

NAME OF DOCUMENT.	For Year.	Pub. Year.	No. of Doc.
Annual Report, Executive Department, Part II..	1891	1892	36
“ “	1892	1893	34
“ “	1893	1894	34



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